Entergy

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J. E. Pollock
Site Vice President

October 23, 2008

Re: Indian Point Units 1 & 2
Docket Nos. 50-3 & 50-247
License Nos. DPR-5 & DPR-26

NL-08-144

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

SUBJECT: Unit 1 & 2 Program for Maintenance of Irradiated Fuel and Preliminary Decommissioning Cost Analysis in accordance with 10 CFR 50.54 (bb) and 10 CFR 50.75(f)(3)

Reference Entergy letter NL-08-147 to NRC, "Notification of Delay of Submittal for Unit 1 & 2 Program for Maintenance of Irradiated Fuel and Preliminary Decommissioning Cost Analysis in accordance with 10 CFR 50.54 (bb) and 10 CFR 50.75(f)(3)," dated September 29, 2008

Dear Sir or Madam:

Pursuant to 10 CFR 50.54(bb) licensees of nuclear power plants that are within five years of the expiration of the reactor operating license shall submit to the NRC the program by which the licensee intends to manage and provide funding for the management of all irradiated fuel at the reactor facility following permanent cessation of operation of the reactor until title to the irradiated fuel and possession of the fuel is transferred to the U. S. Department of Energy for ultimate disposal. The Program for Maintenance of Irradiated Fuel at the IPEC Unit 1 & 2 nuclear units is included as Attachment 1.

Pursuant to 10 CFR 50.75(f)(3), licensees of nuclear power plants that are within five years of the expiration of the reactor operating license shall submit a preliminary decommissioning cost estimate to the NRC. The cost estimates to decommission the IPEC Unit 1 & 2 nuclear units are included as Enclosures 1 and 2 respectively.

A001
NRR

It should be noted that this letter is delayed one month as explained in the referenced letter.

Additionally it should be noted that IP2 has submitted an application for License Renewal pursuant to 10 CFR 54. IP2 operating license is scheduled to expire on Sept 28, 2013. Based on this, Entergy requests that the NRC schedule the review of this information following a final decision on the License Renewal application.

There are no commitments in this submittal.

In accordance with 10 CFR 50.91(b), a copy of this application, with the associated attachments, is being provided to the designated New York State official.

Should you have any questions concerning this submittal, please contact Mr. Robert Walpole at 914-734-6710.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on the 23 day of October, 2008.

Sincerely,

J. E. Pollock
Site Vice President
Indian Point Energy Center

Attachment:
1. Unit No. 1 and 2 10 CFR 50.54(bb) Program for Maintenance of Irradiated Fuel

Enclosures:
1. Preliminary Decommissioning Cost Analysis for the Indian Point Energy Center, Unit 1
2. Preliminary Decommissioning Cost Analysis for the Indian Point Energy Center, Unit 2

cc: Mr. Samuel J. Collins, Regional Administrator, NRC Region 1
Mr. John P. Boska, Senior Project Manager, NRC NRR DORL
NRC Resident Inspectors Office, Indian Point 2 & 3
Mr. Paul Eddy, NYS Department of Public Service
Mr. Robert Callender, Vice President, NYSERDA

Attachment 1 to NL-08-144

Unit No. 1 and 2

10 CFR 50.54(bb) Program for Maintenance of Irradiated Fuel

ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GENERATING UNITS 1 AND 2
DOCKET NOS. 50-3 & 50-247

10 CFR 50.54(bb) Program for Maintenance of Irradiated Fuel

1. Background and Introduction

Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Operations, Inc. (Entergy) are seeking renewal of the operating license for the Indian Point Energy Center, Unit 2 (IP-2), currently set to expire on Sept. 28, 2013. However, pursuant to 10 CFR 50.54(bb), licensees of nuclear power plants that are within five years of the expiration of the reactor operating license shall submit written notification to the Nuclear Regulatory Commission (NRC) for its review and preliminary approval of the program by which the licensee intends to manage and provide funding for the management of all irradiated fuel at the reactor following permanent cessation of operation of the reactor until title to the irradiated fuel and possession of the fuel is transferred to the U.S. Department of Energy (DOE) for ultimate disposal. Since Entergy has submitted an application for License Renewal pursuant to 10 CFR 54, Entergy requests that the NRC schedule the review of this information following a final decision on the License Renewal application.

This document also addresses the management of the spent fuel from Unit 1 (IP-1). The IP-1 spent fuel has been transferred from the wet storage pool to an Independent Spent Fuel Storage Installation (ISFSI) located on the IPEC site. The 160 IP-1 spent fuel assemblies are stored in five (5) multi-purpose canisters (MPCs). The ISFSI is operated and maintained by IP-2.

2. Spent Fuel Management Strategy

Completion of the decommissioning process is highly dependent upon the DOE's ability to remove spent fuel from the site in a timely manner. DOE's repository program assumes that spent fuel allocations will be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was removed from service. The Entergy's current spent fuel management plan for the IP-1 and IP-2 spent fuel is based in general upon: 1) a 2017 start date for repository operations and 2) expectations for spent fuel receipt by the DOE. The Company projects that the IP-1 and IP-2 fuel could be removed from the site as early as 2043, if the oldest fuel allocation receives the highest priority and the geologic repository is able to achieve the DOE' s stated annual rate of transfer (3,000 metric tons of uranium year).

The NRC requires (in 10 CFR 50.54(bb)) that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the DOE. The IP-1 fuel has been relocated to the ISFSI. Interim storage of the IP-2 spent fuel, until the DOE takes receipt, will be in the IP-2 fuel storage building's storage pool and/or at the ISFSI.

IP-2 is projected to generate 1,672 spent fuel assemblies through the end of its currently

licensed operations in 2013. An ISFSI has been constructed to support plant operations within the owner controlled area. This facility will also be used for post-shutdown dry fuel storage. The majority of the assemblies stored in the IP-2 fuel storage building's spent fuel storage pool at the time of shutdown are loaded into MPCs and moved into storage casks on the ISFSI pad by 2019. The remaining assemblies are transferred from the pool directly to the DOE in DOE-provided Transport, Aging and Disposal (TAD) canisters. Over the next 24 years, the MPCs are periodically off-loaded into a DOE transport cask such that all IP-2 canisters (and the five IP-1 canisters) are removed from the site by the year 2043. The Company's analysis conservatively assumes, for purposes only of this report, that the Company does not employ DOE spent fuel disposal contract allowances for up to 20% additional fuel designation for shipment to DOE each year.

In the event that IP-2 does cease operations in 2013, Entergy will continue to comply with existing NRC licensing requirements, including the operation and maintenance of the systems and structures needed to support continued operation of the spent fuel pool and ISFSI, as necessary, under the decommissioning scenario ultimately selected. In addition, Entergy will also comply with applicable license termination requirements in accordance with 10 CFR 50.82 with respect to plant shutdown and post-shutdown activities including seeking such NRC approvals and on such schedules as necessary to satisfy these requirements consistent with the continued storage of irradiated fuel.

3. Cost Considerations

The total costs to decommission IP-1 and IP-2 are delineated in the "Preliminary Decommissioning Cost Analysis" (References 1 and 2). In these documents, decommissioning costs are allocated into the three major categories of license termination, spent fuel management and site restoration. The allocations are reproduced in Tables 1 and 3 (Summary of Major Cost Contributors) for IP-1 and IP-2, respectively. All costs are reported in 2007 nominal dollars.

The timing of the spent fuel management expenditures ($15.929 million for IP-1 and $178.256 million for IP-2) are shown in Tables 2 and 4. The expenditures include direct costs (e.g., for handling, packaging, storing and transferring the spent fuel) as well as indirect cost such as program management and oversight, security, pool and ISFSI operating costs, fees, insurance, etc., projected to be incurred over the post-operations storage period.

The significant contributors to the direct cost of IP-2 spent fuel management (the majority of the costs for IP-1 have already been expended) are identified in Table 5. As shown, costs are included for the procurement of multi-purpose storage canisters as well as the loading and transfer costs associated with transferring the spent fuel from the pool to the ISFSI pad or into a DOE transport cask and the eventual transfer of the fuel at the ISFSI to the DOE. The direct cost of $59.085 million is a subset of the $178.256 million shown in Tables 3 and 4. The timing of the direct spent fuel management expenditures ($59.085 million) is shown in Table 6.

It must also be noted that these figures will vary based on actual DOE performance, including the actual cask provisions and requirements that DOE settles upon. At this time, DOE has not identified any transport casks or requirements. Therefore, there is considerable uncertainty as to the actual costs that may have to be incurred; and uncertainty as to whether the DOE will agree to bear certain of those costs. Major scheduling milestones are identified in Table 7.

At shutdown, the IP-2 spent fuel pool is expected to contain freshly discharged assemblies from the most recent refueling cycles. Over the next eight years (the IP-2 pool is also used to support Unit 3) the assemblies are packaged into TADs for transfer to the DOE or MPCs for transfer to the ISFSI. It is assumed that this time period is sufficient to meet the decay heat requirements for both transport and storage.

The decommissioning scenario assumes that the existing ISFSI can accommodate the spent fuel remaining in the IP-2 pool at shutdown that (it is assumed for purposes of this report) cannot be transferred directly to the DOE. To support decommissioning operations, Entergy anticipates loading 34 MPCs with the assemblies stored in the IP-2 fuel building's spent fuel pool. The MPCs will then be placed in storage casks on the ISFSI.

In the absence of identifiable DOE cask requirements, the design and capacity of the MPCs is based upon a commercial dry cask storage system (Holtec HI-STORM). The Holtec multi-purpose canister has a capacity of 32 fuel assemblies at a unit cost of approximately $720,700. An additional cost of $329,700 is allocated for the concrete storage overpack. It should be noted that Entergy's contract with the DOE requires DOE to provide transport casks to Entergy, but for present purposes, this estimate includes those costs.

An average unit cost of $373,700 was estimated for the labor and equipment to load, seal and transfer each MPC from the storage pool into a DOE transport cask or to the ISFSI. A unit cost of $78,500 was estimated for the final transfer of the MPC at the ISFSI into a DOE transport cask (50% of the cost incurred for transferring the spent fuel from the pool).

Operation of the IP-2 spent fuel pool is discontinued in 2021 once the fuel from both IP-2 and IP-3 has been transferred to dry storage. ISFSI operations continue until such time that the DOE is able to complete the transfer of the fuel from all three units to a federal repository (currently anticipated to be in 2045 for IP-3).

4. ISFSI Decommissioning

With the spent fuel removed from the site, the ISFSI is available for decommissioning. It is assumed that once the MPCs containing the spent fuel assemblies have been removed, any required decontamination performed on the storage modules and the license for the facility terminated, the modules can be dismantled using conventional techniques for the

demolition of reinforced concrete. The concrete storage pad can then be removed and the area regraded. The cost estimated to decontaminate the ISFSI to the extent necessary to release the facilities for conventional demolition is estimated at $1.8 million. Conventional demolition of the remaining overpacks and pads and restoration of the affected area of the site is estimated at $1.3 million.

5. Financial Assurance

As of the year ending December 31, 2007, the trust fund balance for IP-1 was approximately $271.19 million. The IP-2 decommissioning trust fund balance, including the provisional fund, was approximately $347.20 million (Reference 3) for a total of $618.39 million.

As shown in Reference 1, the cost to decommission IP-1 is estimated at approximately $590.930 million (in 2007 dollars). The estimate was based upon a scenario under which the unit would remain in safe-storage until decommissioning operations commence on IP-2 (after being placed in safe-storage for a period such that decommissioning of both IP-1 and IP-2 is complete no later than 60 years after cessation of permanent operations of the last operating unit on the site). Approximately 93% of the total or $547.458 million is estimated to be required to terminate the provisional operating license and 3% of the total or $15.929 million to transfer of the spent fuel to the ISFSI (the remaining 4% is associated with site restoration activities). Costs spent to date and forecasted amounts through the 3rd quarter of 2013 (current license expiration of IP-2) are assumed to be funded from operations, as is currently being done. As shown in Table 8, this amounts to $105.9 million for costs associated with maintaining the unit in safe-storage, performing necessary repairs and facility upkeep and supporting the groundwater investigation, and $12.917 million for containerizing, relocating the spent fuel from the wet pool to the ISFSI, and for IP-1's share of the costs for emergency planning.

As shown in Reference 2, the cost to decommission IP-2 is estimated at approximately $920.5 million (in 2007 dollars). The estimate was based upon a scenario under which the unit would cease operating in 2013, be placed into long-term storage (such that decommissioning is complete no later than 60 years after cessation of permanent operations of the last operating unit on the site) and ultimately decommissioned in conjunction with the two other units at the site. Approximately 72% of the total or $659.351 million is estimated to be required to terminate the operating license and 19% of the total or $178.256 million to manage the spent fuel until such time that it can be transferred to the DOE (the remaining 9% is associated with site restoration activities).

The decommissioning funding plan is shown in Table 8. It uses a 2% real growth in the trust funds over time to demonstrate that the identified scenario is financially viable (i.e., that a surplus is shown in the fund at the completion of decommissioning). Although the decommissioning trust fund is for radiological decommissioning cost only, to the extent that the trust fund balance exceeds costs required for radiological decommissioning, these funds would be available to address costs incurred by the licensee including spent fuel

management costs. The licensee acknowledges the need for an exemption pursuant to 10 CFR 50.12(a) to use radiological decommissioning trust funds for anything beyond decommissioning activities as defined in 10 CFR 50.2. The licensee further acknowledges the need for Commission approval pursuant to 10 CFR 50.82(a)(3) for completion of decommissioning beyond 60 years for earlier-shutdown reactors on the site.

It should be noted that the projected expenditures for spent fuel management identified in the decommissioning cost analysis do not consider the outcome of the litigation (including compensation for damages) with the DOE with regards to the delays incurred by Entergy in the timely removal of the spent fuel from the site. Entergy views the extended spent fuel management costs to be damages that should be paid by the government because of the Department of Energy's breach of the spent fuel disposal contract.

6. References

1. "Preliminary Decommissioning Cost Analysis for the Indian Point Energy Center, Unit 1," Document No. E11-1583-004, TLG Services, Inc., October 2008

2. "Preliminary Decommissioning Cost Analysis for the Indian Point Energy Center, Unit 2," Document No. E11-1583-003, TLG Services, Inc., October 2008

3. Entergy Letter ENOC-08-00028, dated May 08, 2008, "Decommissioning Fund Status Report"

TABLE 1
Indian Point Energy Center, Unit 1
Summary of Major Cost Contributors
(thousands, 2007 dollars)

	License Termination	Spent Fuel Management	Site Restoration	Total
Decontamination	8,442	-	-	8,442
Removal	81,600	-	20,195	101,794
Packaging	26,806	-	-	26,806
Transportation	39,940	-	-	39,940
Waste Disposal	88,373	-	-	88,373
Off-site Waste Processing (off-site)	14,031	-	-	14,031
Program Management [1]	77,872	-	6,917	84,789
Corporate A&G	-	-	-	-
Site O&M	10,622	-	-	10,622
Spent Fuel Management [2]	-	15,756	-	15,756
Insurance and Regulatory Fees	34,881	173	-	35,054
Energy	14,627	-	431	15,058
Radiological Characterization	11,764	-	-	11,764
Property Taxes	-	-	-	-
Miscellaneous Equipment	14,058	-	1	14,059
Environmental	33,464	-	-	33,464
IP-1 Project/Recurring Costs	90,978	-	-	90,978
Total	547,458	15,929	27,543	590,930

[1] Includes security and engineering
[2] Includes costs spent to date and an allocation of site emergency planning fees through 2015 (IP-3 shutdown)

TABLE 2
Indian Point Energy Center, Unit 1
Schedule of Annual Expenditures
Spent Fuel Management Cost
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other *	Yearly Totals
2001-2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
2007	1,187	3,860	0	0	0	5,047
2008	0	0	0	0	1,512	1,512
2009	0	0	0	0	1,339	1,339
2010	0	0	0	0	1,339	1,339
2011	0	0	0	0	1,339	1,339
2012	0	0	0	0	1,339	1,339
2013	0	0	0	0	1,339	1,339
2014	0	0	0	0	1,339	1,339
2015	0	0	0	0	1,339	1,339
Total	1,187	3,860	0	0	10,882	15,929

* Prorated share of site Emergency Planning Fees

TABLE 3
Indian Point Energy Center, Unit 2
Summary of Major Cost Contributors
(thousands, 2007 dollars)

	License Termination	Spent Fuel Management	Site Restoration	Total
Decontamination	13,539	-	-	13,539
Removal	86,741	2,058	45,099	133,898
Waste Packaging	13,502	3	-	13,505
Transportation	21,005	119	-	21,124
Waste Disposal	63,760	107	-	63,867
Waste Conditioning (Off-site)	32,441	-	-	32,441
Program Management [1]	246,534	73,658	36,506	356,698
Corporate A&G	33,688	-	-	33,688
Site O&M	22,246	3,709	-	25,955
ISFSI Related [2]	-	95,895	-	95,895
Spent Fuel Pool Isolation	10,503	-	-	10,503
Insurance and Regulatory Fees	47,813	742	-	48,555
Energy	31,888	1,966	1,260	35,114
Radiological Characterization	17,072	-	-	17,072
Property Taxes	-	-	-	-
Miscellaneous Equipment	15,098	-	4	15,102
Environmental	3,521	-	-	3,521
Total	659,351	178,256	82,869	920,477

[1] Includes security and engineering
[2] Includes capital costs for multi-purpose storage containers, packaging and handling (transfer pool to ISFSI or DOE and ISFSI to DOE)

TABLE 4
Indian Point Energy Center, Unit 2
Schedule of Annual Expenditures
Spent Fuel Management Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2013	0	0	0	0	514	514
2014	0	0	0	0	1,974	1,974
2015	6,025	4,762	238	0	2,255	13,279
2016	7,989	6,314	315	0	2,352	16,971
2017	7,968	6,297	314	0	2,345	16,924
2018	7,968	6,297	314	0	2,345	16,924
2019	7,968	6,297	314	0	2,345	16,924
2020	7,989	6,314	315	0	2,352	16,971
2021	4,728	3,207	155	0	1,629	9,720
2022	1,577	201	0	0	933	2,711
2023	1,577	201	0	0	933	2,711
2024	1,581	202	0	0	936	2,718
2025	1,577	201	0	0	933	2,711
2026	1,577	201	0	0	933	2,711
2027	1,577	201	0	0	933	2,711
2028	1,581	202	0	0	936	2,718
2029	1,577	201	0	0	933	2,711
2030	1,577	201	0	0	933	2,711
2031	1,577	201	0	0	933	2,711
2032	1,581	202	0	0	936	2,718
2033	1,577	201	0	0	933	2,711
2034	1,577	201	0	0	933	2,711
2035	1,577	201	0	0	933	2,711
2036	1,581	202	0	0	936	2,718
2037	1,577	201	0	0	933	2,711
2038	1,577	201	0	0	933	2,711
2039	1,577	201	0	0	933	2,711
2040	1,581	202	0	0	936	2,718
2041	1,577	201	0	0	933	2,711
2042	1,577	201	0	0	933	2,711
2043	1,577	201	0	0	933	2,711
2044	1,581	202	0	0	936	2,718

TABLE 4 (continued)
Indian Point Energy Center, Unit 2
Schedule of Annual Expenditures
Spent Fuel Management Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2045	1,503	192	0	0	889	2,585
2046	0	0	0	0	0	0
2047	0	0	0	0	0	0
2048	0	0	0	0	0	0
2049	0	0	0	0	0	0
2050	0	0	0	0	0	0
2051	0	0	0	0	0	0
2052	0	0	0	0	0	0
2053	0	0	0	0	0	0
2054	0	0	0	0	0	0
2055	0	0	0	0	0	0
2056	0	0	0	0	0	0
2057	0	0	0	0	0	0
2058	0	0	0	0	0	0
2059	0	0	0	0	0	0
2060	0	0	0	0	0	0
2061	0	0	0	0	0	0
2062	0	0	0	0	0	0
2063	0	0	0	0	0	0
2064	0	0	0	0	0	0
2065	0	0	0	0	0	0
2066	0	0	0	0	0	0
2067	423	191	0	81	666	1,361
2068	137	68	0	26	215	446
2069	32	280	0	0	6	318
2070	32	280	0	0	6	318
2071	32	280	0	0	6	318
2072	31	276	0	0	6	314
Total	89,115	45,689	1,966	107	41,379	178,256

TABLE 5
Indian Point Energy Center, Unit 2
Significant Cost Contributors

Spent Fuel Management - Direct Expenditures	(2007 dollars)*
Spent Fuel Transfer Facility	1,884,954
Capital Costs of ISFSI MPCs and Overpack	35,711,333
MPC Loading Costs	10,179,417
MPC Transfer Costs from Pool to DOE	3,042,034
MPC Transfer Costs from Pool to ISFSI	5,340,703
MPC Transfer Costs from ISFSI to DOE	3,926,988
Total	59,085,429

* Contingency has been added to all costs (15%)

TABLE 6
Indian Point Energy Center, Unit 2
Estimated Expenditures for Spent Fuel Packaging
Storage and Canister Transfer *

Year	Fuel Transfer	Pool to DOE Loading	Pool to DOE Transfer	ISFSI Cask Costs	Pool to ISFSI Loading	Pool to ISFSI Transfer	ISFSI to DOE Transfer **	Total ($2007)
2013	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0
2016	0	0	0	14,704,667	0	0	0	14,704,667
2017	0	0	0	19,956,333	3,032,167	2,199,113	0	25,187,613
2018	0	649,750	471,239	1,050,333	4,115,083	2,984,511	0	9,270,916
2019	0	649,750	471,239	0	216,583	157,080	0	1,494,651
2020	0	649,750	471,239	0	0	0	0	1,120,989
2021	0	866,333	628,318	0	0	0	0	1,494,651
2022	1,884,954	0	0	0	0	0	235,619	2,120,573
2023	0	0	0	0	0	0	314,159	314,159
2024	0	0	0	0	0	0	157,080	157,080
2025	0	0	0	0	0	0	157,080	157,080
2026	0	0	0	0	0	0	157,080	157,080
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	235,619	235,619
2029	0	0	0	0	0	0	235,619	235,619
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	157,080	157,080
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	157,080	157,080
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	235,619	235,619
2036	0	0	0	0	0	0	235,619	235,619
2037	0	0	0	0	0	0	157,080	157,080
2038	0	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	235,619	235,619
2040	0	0	0	0	0	0	235,619	235,619
2041	0	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	157,080	157,080
2043	0	0	0	0	0	0	863,937	863,937
	1,884,954	2,815,583	2,042,034	35,711,333	7,363,833	5,340,703	3,926,988	59,085,429

* A 15% contingency factor has been applied to all spent fuel related costs
** Includes the cost to transfer six casks containing IP-1 spent fuel

TABLE 7
Indian Point Energy Center, Unit 2
Projected Schedule and Milestones

Major Milestones and Fuel-Related Events	
Currently scheduled cessation of plant operations	September 2013
ISFSI available	Pre-shutdown
First MPC transferred post-shutdown from pool to ISFSI	2017
Last MPC transferred post-shutdown from pool to ISFSI	2019
End of wet storage pool operations [1]	2021
DOE begins to receive commercial spent fuel	2017
1st fuel assembly removed from site	2018
Last Indian Point-2 fuel assembly leaves site	2043
Last year of ISFSI operations [2]	2045
ISFSI decommissioned [3]	2067 - 2068
ISFSI demolition [3]	2069 - 2072

[1] Extended use to support Indian Point 3 fuel transfer
[2] ISFSI operational until Indian Point 3 fuel transfer complete
[3] ISFSI decontaminated and dismantled in conjunction with decommissioning of the three nuclear units on site

TABLE 8
Decommissioning Funding Plan
IP-1 Coordinated with IP-2, 2013 Shutdown and 60-Year SAFSTOR

Basis Year		2007					
Fund Balance		$618.383	(millions)				
Annual Escalation		0.00%					
Annual Earnings		2.00%					
	A	B	C	D	E	F	G
Year	IP-1 License Termination Cost Estimate (millions)	IP-2 License Termination Cost Estimate (millions)	IP-1 Spent Fuel Cost Estimate (millions)	IP-2 Spent Fuel Cost Estimate (millions)	Total Cost Estimate (millions)	Total Cost Escalated at 0% (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2001	$105.900 million spent and budgeted through 3rd quarter of 2013 funded by operations		$12.917 million spent and budgeted through 3rd quarter of 2013 funded by operations				618.383
2002							630.751
2003							643.366
2004							656.233
2005							669.358
2006							682.745
2007							618.383
2008							630.751
2009							643.366
2010							656.233
2011							669.358
2012							682.745
2013	1.059	11.164	0.335	0.514	13.07	13.072	683.328
2014	4.236	49.271	1.339	1.974	56.82	56.820	640.174
2015	4.236	25.307	1.339	13.279	44.16	44.161	608.817
2016	2.656	3.711	-	16.971	23.34	23.338	597.655
2017	2.649	3.701	-	16.924	23.27	23.274	586.334
2018	2.649	3.701	-	16.924	23.27	23.274	574.787
2019	2.649	3.701	-	16.924	23.27	23.274	563.008
2020	2.656	3.711	-	16.971	23.34	23.338	550.931
2021	2.649	3.688	-	9.720	16.06	16.057	545.892
2022	2.649	3.676	-	2.711	9.04	9.036	547.774
2023	2.649	3.676	-	2.711	9.04	9.036	549.694
2024	2.656	3.686	-	2.718	9.06	9.060	551.627
2025	2.649	3.676	-	2.711	9.04	9.036	553.624
2026	2.649	3.676	-	2.711	9.04	9.036	555.660
2027	2.649	3.676	-	2.711	9.04	9.036	557.738
2028	2.656	3.686	-	2.718	9.06	9.060	559.832
2029	2.649	3.676	-	2.711	9.04	9.036	561.993
2030	2.649	3.676	-	2.711	9.04	9.036	564.197
2031	2.649	3.676	-	2.711	9.04	9.036	566.445

TABLE 8 (continued)
Decommissioning Funding Plan
IP-1 Coordinated with IP-2, 2013 Shutdown and 60-Year SAFSTOR

Basis Year		2007					
Fund Balance		$618.383	(millions)				
Annual Escalation		0.00%					
Annual Earnings		2.00%					
	A	B	C	D	E	F	G
Year	IP-1 License Termination Cost Estimate (millions)	IP-2 License Termination Cost Estimate (millions)	IP-1 Spent Fuel Cost Estimate (millions)	IP-2 Spent Fuel Cost Estimate (millions)	Total Cost Estimate (millions)	Total Cost Escalated at 0% (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2032	2.656	3.686	-	2.718	9.06	9.060	568.714
2033	2.649	3.676	-	2.711	9.04	9.036	571.052
2034	2.649	3.676	-	2.711	9.04	9.036	573.437
2035	2.649	3.676	-	2.711	9.04	9.036	575.870
2036	2.656	3.686	-	2.718	9.06	9.060	578.327
2037	2.649	3.676	-	2.711	9.04	9.036	580.858
2038	2.649	3.676	-	2.711	9.04	9.036	583.439
2039	2.649	3.676	-	2.711	9.04	9.036	586.072
2040	2.656	3.686	-	2.718	9.06	9.060	588.733
2041	2.649	3.676	-	2.711	9.04	9.036	591.472
2042	2.649	3.676	-	2.711	9.04	9.036	594.265
2043	2.649	3.676	-	2.711	9.04	9.036	597.114
2044	2.656	3.686	-	2.718	9.06	9.060	599.997
2045	2.611	3.675	-	2.585	8.87	8.871	603.126
2046	1.826	3.668	-	-	5.49	5.494	609.694
2047	1.826	3.668	-	-	5.49	5.494	616.394
2048	1.831	3.678	-	-	5.51	5.509	623.213
2049	1.826	3.668	-	-	5.49	5.494	630.183
2050	1.826	3.668	-	-	5.49	5.494	637.293
2051	1.826	3.668	-	-	5.49	5.494	644.545
2052	1.831	3.678	-	-	5.51	5.509	651.927
2053	1.826	3.668	-	-	5.49	5.494	659.471
2054	1.826	3.668	-	-	5.49	5.494	667.167
2055	1.826	3.668	-	-	5.49	5.494	675.016
2056	1.831	3.678	-	-	5.51	5.509	683.007
2057	1.826	3.668	-	-	5.49	5.494	691.173
2058	1.826	3.668	-	-	5.49	5.494	699.503
2059	1.826	3.668	-	-	5.49	5.494	707.999
2060	1.831	3.678	-	-	5.51	5.509	716.650
2061	1.826	3.668	-	-	5.49	5.494	725.489
2062	1.826	3.668	-	-	5.49	5.494	734.505

TABLE 8 (continued)
Decommissioning Funding Plan
IP-1 Coordinated with IP-2, 2013 Shutdown and 60-Year SAFSTOR

Basis Year		2007					
Fund Balance		$618.383	(millions)				
Annual Escalation		0.00%					
Annual Earnings		2.00%					
	A	B	C	D	E	F	G
Year	IP-1 License Termination Cost Estimate (millions)	IP-2 License Termination Cost Estimate (millions)	IP-1 Spent Fuel Cost Estimate (millions)	IP-2 Spent Fuel Cost Estimate (millions)	Total Cost Estimate (millions)	Total Cost Escalated at 0% (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2063	1.826	3.668	-	-	5.49	5.494	743.701
2064	1.831	24.751	-	-	26.58	26.582	731.993
2065	1.826	55.625	-	-	57.45	57.451	689.182
2066	18.899	168.560	-	-	187.46	187.459	515.506
2067	68.313	71.834	-	1.361	141.51	141.508	384.308
2068	148.490	25.113	-	0.446	174.05	174.049	217.946
2069	17.216	6.046	-	0.318	23.58	23.580	198.725
2070	17.216	6.046	-	0.318	23.58	23.580	179.119
2071	17.216	6.046	-	0.318	23.58	23.580	159.121
2072	17.235	6.547	-	0.314	24.10	24.096	138.208
2073	11.400	26.485	-	-	37.89	37.885	103.087
	441.55 [1]	659.36	3.01 [2]	178.26	1,282.17	1,282.17	

Notes:

[1] Does not include the $105.900 million funded by operations
[2] Does not include the $12.917 million funded by operations

Calculations:

Column E = A + B + C + D
Column F = (E)*(1+0%)^(current year – 2007) or for 0%, F = E
Column G = (Previous year's fund balance) * (1 + .02) – F (current year's decommissioning expenditures)

Enclosure 1 to NL-08-144

Preliminary Decommissioning Cost Analysis for the Indian Point Energy Center, Unit 1

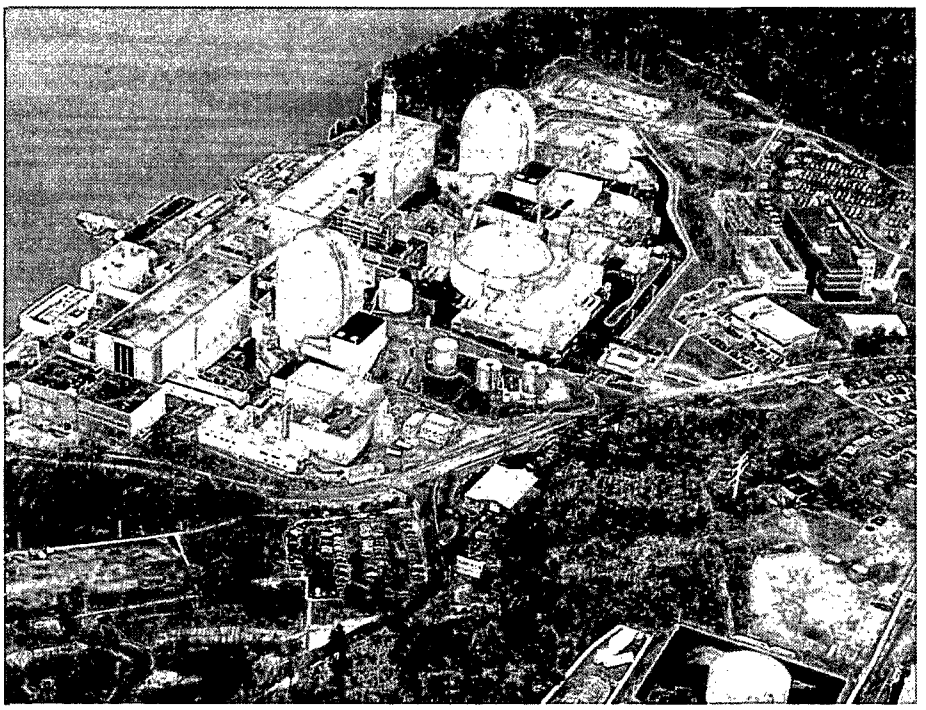
ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GENERATING UNIT 1
DOCKET NO. 50-3

Document E11-1583-004

PRELIMINARY DECOMMISSIONING COST ANALYSIS

for the

INDIAN POINT ENERGY CENTER, UNIT 1



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Entergy Nuclear

prepared by

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Bridgewater, Connecticut

October 2008

APPROVALS

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APPENDIX

REVISION LOG

No.	CRA No.	Date	Item Revised	Reason for Revision
0		10-22-2008		Original

1. DECOMMISSIONING COST ANALYSIS

Unit 1 at the Indian Point Energy Center (IP-1) was shutdown in October of 1974 after 12 years of operation. The former owner (Consolidated Edison) suspended operation because the plant's emergency core cooling system did not satisfy the criteria that had come into effect after its start up. Since that time, the unit has remained in protective storage with the spent fuel stored in one of the wet pools. Recent concerns of pool integrity prompted a decision to relocate the spent fuel to an on-site dry storage facility. The transfer process has been completed. The pool is expected to be drained by the end of the year (2008). The estimate for IP-1 represents the cost to decommission the unit, including the costs spent to date (since acquisition by Entergy) to maintain the facility, needed repairs, and for capital improvements to minimize long-term caretaking costs.

For purposes of this analysis, IP-1 is expected to remain in dormancy until the adjacent units are decommissioned. In 2003, the U.S. Nuclear Regulatory Commission (NRC) issued Amendment No. 52 to the Provisional Operating License for IP-1. Included within the amendment was a change to expiration date of the IP-1 license to be consistent with that of IP-2 (currently September 28, 2013).

Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Operations, Inc. (Entergy) is seeking renewal of the operating license for IP-2. However, pursuant to 10 CFR 50.75(f)(3), licensees of nuclear power plants that are within five years of the expiration of the reactor operating license shall submit a preliminary decommissioning cost estimate to the NRC for its review. An estimate has been submitted for IP-2. [1]

Under the assumption that IP-2 would cease operation in 2013, the unit would then enter decommissioning. Due to the proximity of IP-1 and facilities shared by the two units, the decommissioning of IP-2 is expected to impact IP-1. As such, this analysis has been prepared assuming that status of IP-1 could significantly change with the shutdown of IP-2. As such, this estimate is intended to meet the 50.75(f)(3) requirement for IP-1.

The scenario evaluated in Reference 1 assumed that IP-2 would cease operation in 2013. It would then be placed into safe storage for a period up to 60 years, at which time the unit would be decontaminated and dismantled. This estimate assumes that the decommissioning of IP-1 would be coordinated with the decommissioning of IP-2 (and IP-3) as an integrated site activity. In accordance with the requirements of 10

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1 "Preliminary Decommissioning Cost Analysis for the Indian Point Energy Center, Unit 2," Document No. E11-1583-003, prepared by TLG Services, dated October 2008

CFR 50.75(f)(3), this cost estimate includes an assessment of the major factors that could affect the cost to decommission the IP-1 nuclear unit.

The cost to decommission IP-1 is estimated at $590.930 million. The cost is presented in 2007 dollars for consistent year comparison with the Company's latest filing on the status of the IP-1 decommissioning trust fund.[2]

The estimate for IP-1 assumes that it is decommissioned in conjunction with the two adjacent units. As such, there are savings as well as additional costs that are reflected within the estimate from the synergies of site decommissioning and the constraints imposed in working on a complex and congested site. In apportioning site decommissioning costs by unit, not all common costs are shared equitably and some costs elements are impacted by activities or previous operations at adjacent units.

The cost includes the monies anticipated to be spent for operating license termination, spent fuel storage and site remediation activities. The cost is based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site remediation and restoration requirements. Many of these assumptions are discussed in more detail in this document.

Entergy intends to fund the expenditures for license termination (comprising approximately 93% of the total cost) from site operations and/or the currently existing decommissioning trust fund. Any surplus in the fund may be used to offset the cost of spent fuel management and/or site restoration, recognizing that the licensee would need to make the appropriate submittals for an exemption in accordance with 10 CFR 50.12 from the requirements of 10 CFR 50.82(a)(8)(i)(A) in order to use the decommissioning trust funds for non-decommissioning related expenses, as defined by 10 CFR 50.2.

Expenditures from the trust fund for non-license termination activities will not reduce the value of the decommissioning trust fund to below the amount necessary to place and maintain the reactor in safe storage and may require an exemption under 10 CFR 50.12(a).

1.1 DECOMMISSIONING ALTERNATIVES

The Nuclear Regulatory Commission (NRC) provided general decommissioning guidance in a rule adopted on June 27, 1988.[3] In this rule, the NRC set forth

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2 Entergy Nuclear Operations' submittal of its "Decommissioning Fund Status Report" to the Nuclear Regulatory Commission, Letter No. ENOC-08-00028, dated May 8, 2008

3 U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72 "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, Federal Register Volume 53,

technical and financial criteria for decommissioning licensed nuclear facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

> DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."[4]
>
> SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."[5] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.
>
> ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactive material decays to a level permitting unrestricted release of the property."[6] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years.

1.2 REGULATORY GUIDANCE

In 1996, the NRC published revisions to its general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process.[7] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184, issued in July 2000, further

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Number 123 (p 24018 et seq.), June 27, 1988

4 Ibid. Page FR24022, Column 3

5 Ibid.

6 Ibid. Page FR24023, Column 2

7 U.S. Code of Federal Regulations, Title 10, Parts 2, 50, and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, Federal Register Volume 61, (p 39278 et seq.), July 29, 1996

described the methods and procedures that are acceptable to the NRC staff for implementing the requirements of the 1996 revised rule that relate to the initial activities and the major phases of the decommissioning process. The cost estimate for IP-1 follows the general guidance and sequence presented in the amended regulations.

1.3 BASIS OF COST ESTIMATE

IP-1 is already in decommissioning (safe-storage). For the purpose of this analysis, it is assumed to remain in storage until IP-2 is decommissioned (in 2064).[8] The sequence of events is delineated in Figure 1 along with major milestone dates.

The decommissioning estimate was developed using the site-specific, technical information relied upon in the decommissioning assessments prepared in 2000 and 2002.[9][10] This information was reviewed for the current analysis and updated to reflect any significant changes in the plant configuration over the past five years. The site-specific considerations and assumptions used in the previous evaluation were also revisited. Modifications were incorporated where new information was available or experience from recent decommissioning projects provided viable alternatives or improved processes. On site interviews were conducted between August and November 2007 to assist in obtaining current site specific conditions as well as collect financial data.

1.4 METHODOLOGY

The methodology used to develop the estimate followed the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"[11] and the DOE "Decommissioning Handbook."[12] These documents present a unit cost factor method for estimating decommissioning activity costs that simplifies the calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) were developed using local labor rates. The activity-dependent costs were then estimated with the item quantities (cubic yards and tons), developed from plant drawings and

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8 "Preliminary Decommissioning Cost Analysis for Indian Point Energy Center, Unit 2," prepared by TLG Services, Document No, E11-1583-003, October 2008

9 Decommissioning Cost Evaluation Due Diligence Estimate for the Indian Point 1 & 2 Nuclear Generating Stations Document No. E11-1395-002, September 2000.

10 TLG Document No. E11-1449-002, December 19, 2002

11 T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

12 W.J. Manion and T.S. LaGuardia, "Decommissioning Handbook," U.S. Department of Energy, DOE/EV/10128-1, November 1980

inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, "Building Construction Cost Data," published by R.S. Means.[13]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted.

This analysis reflected lessons learned from TLG's involvement in the Shippingport Station decommissioning, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells, and associated facilities, completed in 1997. In addition, the planning and engineering for the Pathfinder, Shoreham, Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Connecticut Yankee, and San Onofre-1 nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

TLG has historically applied work difficulty adjustment factors (WDFs) to account for the inefficiencies in working in a power plant environment. WDFs are assigned to each unique set of unit factors, commensurate with the working conditions. The ranges used for the WDFs were as follows:

• Access Factor	0% to 30%
• Respiratory Protection Factor	0% to 50%
• Radiation/ALARA Factor	0% to 10%
• Protective Clothing Factor	0% to 30%
• Work Break Factor	8.33%

The factors and their associated range of values were originally developed in conjunction with the AIF/NESP-036 study.

Scheduling Program Durations

Activity durations are used to develop the total decommissioning program schedule. The unit cost factors, adjusted for WDFs as described above, are

13 "Building Construction Cost Data 2007," Robert Snow Means Company, Inc., Kingston, Massachusetts

applied against the inventory of materials to be removed. The work area (or building area) is then evaluated for the most efficient number of workers/crews for the identified decommissioning activities. The adjusted unit cost factors are then compared against the available manpower so that an overall duration for removal of components and piping from each work area can be calculated.

The schedule is used to assign carrying costs, which include program management, administration, field engineering, equipment rental, and support services such as quality control and security.

1.5 IMPACT OF DECOMMISSIONING MULTIPLE REACTOR UNITS

In estimating the near simultaneous decommissioning of three co-located reactor units there can be opportunities to achieve economies of scale, by sharing costs between units, and coordinating the sequence of work activities. There will also be schedule constraints, particularly where there are requirements for specialty equipment and staff, or practical limitations on when final status surveys can take place. The estimate for IP-1 considered:

- Savings in program management, in particular costs associated with the more senior positions, from the sequential decommissioning of multiple reactors. The estimate assumes that IP-2 is the lead unit in decommissioning through the disposition of the reactor vessel and primary system components, at which time IP-3 assumes the lead. Costs for the senior staff positions are only included for the lead unit.
- The confines of a congested site and the need to coordinate dismantling operations. Demolition and soil remediation, following the primary decommissioning phase (removal of major source terms and radiological inventory), are conducted as a site-wide activity.
- Sharing of station costs such as ISFSI operations, emergency response fees, regulatory agency fees, corporate overhead, and insurance.

1.6 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal (i.e., license termination and site restoration).

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the

DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

1.6.1 Contingency

Consistent with standard cost estimating practices, contingencies were applied to the decontamination and dismantling costs developed as a "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."[14] The cost elements in the estimate were based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, were addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the extended storage period.

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the end of the detailed estimate. The composite contingency value reported for the SAFSTOR scenario, and as shown in the detail table in Appendix A, is 14.6%. This does not include contingency on the costs reported for Period 0a (expenditures and budgeted items through year 2015).

1.6.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these

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[14] Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239.

types of costs under the broad term "financial risk." Included within the category of financial risk are:

- Delays in approval of the decommissioning plan due to intervention, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes (e.g., affecting worker health and safety, site release criteria, waste transportation, and disposal).
- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition).
- Pricing changes for basic inputs, such as labor, energy, materials, and burial.

It has been TLG's experience that the results of a risk analysis, when compared with the base case estimate for decommissioning, indicate that the chances of the base decommissioning estimate's being too high is a low probability, and the chances that the estimate is too low is a higher probability. This cost study, however, does not add any additional costs to the estimate for financial risk, since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk should be revisited periodically and addressed through updates of the base estimate.

1.7 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below were included within the estimate.

1.7.1 Spent Fuel Disposition

Congress passed the "Nuclear Waste Policy Act"[15] (NWPA) in 1982, assigning the federal government's long-standing responsibility for

15 "Nuclear Waste Policy Act of 1982 and Amendments," U.S. Department of Energy's Office of Civilian Radioactive Management, 1982

disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The NWPA provided that DOE would enter into contracts with utilities in which DOE would promise to take the utilities' spent fuel and high-level radioactive waste and utilities would pay the cost of the disposition services for that material. NWPA, along with the individual contracts with the utilities, specified that the DOE was to begin accepting spent fuel by January 31, 1998.

Since the original legislation, the DOE has announced several delays in the program schedule. By January 1998, the DOE had failed to accept any spent fuel or high level waste, as required by the NWPA and utility contracts. Delays continue and, as a result, generators have initiated legal action against the DOE in an attempt to obtain compensation for DOE's breach of contract.

Operation of DOE's yet-to-be constructed repository is contingent upon the review and approval of the facility's license application by the NRC, the successful resolution of pending litigation, and the development of a national transportation system. The DOE submitted its license application to the NRC on June 3, 2008, seeking authorization to construct the repository at Yucca Mountain, Nevada. Assuming a timely review, DOE expects that receipt of fuel could begin as early as 2017,[16] depending upon the level of funding appropriated by Congress.

The NRC requires that licensees establish a program to manage and provide funding for the management of all irradiated fuel at the reactor until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb).[17] This funding requirement is fulfilled through inclusion of certain cost elements in the decommissioning estimate, for example, costs associated the relocation of the spent fuel to the ISFSI.

The assemblies stored in the IP-1 spent fuel pool have been transferred to the ISFSI. The 160 assemblies are stored in five (5) dry storage casks. The pool is expected to be drained by the end of the year (2008).

DOE's contracts with utilities generally order the acceptance of spent fuel from utilities based upon the oldest fuel receiving the highest priority. For purposes of this analysis, acceptance of commercial spent fuel by the DOE was expected to begin in 2017. The first assemblies removed from the

16 "DOE Announces Yucca Mountain License Application Schedule", U.S. Department of Energy's Office of Public Affairs, Press Release July 19, 2006

17 U.S. Code of Federal Regulations, Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," Subpart 54 (bb), "Conditions of Licenses"

IPEC site was assumed to be in 2018. With an estimated rate of transfer of 3,000 metric tons of uranium (MTU)/year for the commercial industry, completion of the removal of all fuel from the site was projected to be in the year 2045 assuming the shutdown of IP-2 in 2013 and IP-3 in 2015. Entergy Nuclear's analysis assumes, for purposes only of this report, that Entergy Nuclear does not employ DOE spent fuel disposal contract allowances for up to 20% additional fuel designation for shipment to DOE each year.

Entergy Nuclear's position is that the DOE has a contractual obligation to accept IPEC fuel earlier than the projections set out above. No assumption made in the study should be interpreted to be inconsistent with this claim. However, at this time, including the cost of storing spent fuel in this study is the most reasonable approach because it insures the availability of sufficient decommissioning funds at the end of the station's life if, contrary to its contractual obligation, the DOE has not performed earlier.

ISFSI

The IP-1 spent fuel has been relocated to an ISFSI constructed within the protected area (PA) to support IP-2 plant operations. Operation and maintenance costs for the ISFSI are included in the IP-2 estimate.

Storage Canister Design

The IP-1 fuel (160 assemblies) is stored in a Holtec HI-STORM dry cask storage system. The Holtec multi-purpose canister or MPC has a capacity of 32 fuel assemblies.

Canister Loading and Transfer

The estimate includes the costs spent to date to purchase, load, and transfer the MPCs from the pool to the ISFSI. Costs to transfer the spent fuel from the ISFSI to the DOE at some time in the future are included within the estimate for IP-2.

ISFSI Decommissioning

The cost for the eventual decontamination and demolition of the five storage casks for IP-1 spent fuel are included in the estimate for IP-2.

GTCC

The dismantling of the reactor internals generates radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the Federal Government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. However, to date, the Federal Government has not identified a cost for disposing of GTCC or a schedule for acceptance. As such, the estimate to decommission IP-1 includes an allowance for the disposition of GTCC material.

For purposes of this study, GTCC is packaged in the same canisters used for spent fuel. The GTCC material is assumed to be shipped directly to a DOE facility as it is generated (since the fuel has been removed from the site prior to the start of decommissioning and the ISFSI deactivated).

1.7.2 Reactor Vessel and Internal Components

The reactor pressure vessel and reactor internal components are segmented for disposal in shielded transportation casks. Segmentation and packaging of the internals are performed in the refueling canal where a turntable and remote cutter are installed. The vessel is segmented in place using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor well. Transportation cask specifications and Department of Transportation (DOT) regulations dictate segmentation and packaging methodology (i.e., packaging will meet the current physical and radiological limitations and regulations). Cask shipments are made in DOT-approved, currently available truck casks.

As stated previously, the dismantling of reactor internals at the IPEC reactors will generate radioactive waste considered unsuitable for shallow land disposal (i.e., GTCC). For purposes of this study, the GTCC radioactive waste has been packaged and disposed of as high-level waste, at a cost equivalent to that envisioned for the spent fuel.

Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and

transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package. However, the location of the Trojan Nuclear Plant on the Columbia River simplified the transportation analysis since.

It is not known whether this option will be available when the IPEC units cease operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. Consequently, the study assumes the reactor vessel will be segmented, as a bounding condition.

1.7.3 Primary System Components

The current scenario defers decommissioning for approximately 50 years after IP-2 ceases operations. The delay will result in lower working area dose rate (from natural decay of the radionuclides produced from plant operations). As such, decontamination of the reactor coolant system components and associated reactor water cleanup systems is not anticipated to be necessary and no allowance is included for this activity within the estimate.

Reactor coolant piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) drops below the nozzle zone. The reactor coolant pumps and motors are lifted out intact, packaged, and transported for processing or disposal.

The generators are rigged for removal, disconnected from the surrounding piping and supports, and maneuvered into the open area for extraction from containment. Each generator is removed from containment and placed onto a multi-wheeled vehicle for transport to an on-site preparation area. Disposal costs are based upon the displaced volume of the steam generators.

1.7.4 Main Turbine and Condenser

The main turbine is dismantled using conventional maintenance procedures. The turbine rotors and shafts are removed to a laydown area. The lower turbine casings are removed from their anchors by controlled demolition. The main condensers are also disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it will be surveyed and designated for

either decontamination or volume reduction, conventional disposal, or controlled disposal. Components are packaged and readied for transport in accordance with the intended disposition.

1.7.5 Transportation Methods

It is expected that most of the contaminated piping, components, and structural material, other than the highly activated reactor vessel and internal components, will qualify as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as described in Title 49.[18] The contaminated material is packaged in Industrial Packages, as defined in subpart 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with §71, as Type B. It is conceivable that the reactor may qualify as LSA II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has not reached levels exceeding those that permit the major reactor components to be shipped under current transport regulations requirements.

Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, is by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible is based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

[18] U.S. Department of Transportation, Section 49 of the Code of Federal Regulations, "Transportation," Parts 173 through 178, 2007

Considering the location of IPEC (see map) and potential for restricted road use, it is assumed that transportation of materials requiring controlled disposal will utilize the Hudson River via barge shipment to the nearest transfer point for rail or trucking to the Energy-Solutions' facility in Clive, Utah. However, for estimating purposes, costs to transport the majority of the low-level radioactive waste were based upon truck transport costs developed from published tariffs from Tri-State Motor Transit.[19] Memphis (TN) was used as the destination for off-site processing.

1.7.6 Low-Level Radioactive Waste Conditioning and Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980,[20] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders.

The federal law encouraged the formation of regional groups or compacts to implement this objective safely, efficiently, and economically, and set a target date of 1986 for implementation. After little progress, the "Low-Level Radioactive Waste Policy Amendments Act of 1985,[21] extended the implementation schedule, with specific milestones and stiff sanctions for non-compliance. Subsequent court rulings have substantially diluted those sanctions and, to date, no new compact facilities have been successfully sited, licensed and constructed.

At the time this analysis was prepared, IP-1 was able to dispose of Class A, B or C low-level radioactive waste[22] at the licensed commercial low-level radioactive waste disposal facility in Barnwell, South Carolina. In June 2000, South Carolina formally joined with Connecticut and New Jersey to form the Atlantic Compact. South Carolina legislation requires South Carolina to gradually limit disposal capacity at the Barnwell facility through mid-2008. As of June 30, 2008, access to the Barnwell

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19 Tri-State Motor Transit Company, published tariffs, Interstate Commerce Commission (ICC), Docket No. MC-427719 Rules Tariff, March 2004, Radioactive Materials Tariff, February 2006.

20 "Low Level Radioactive Waste Policy Act of 1980," Public Law 96-573, 1980

21 "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, January 15, 1986

22 U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

Low-Level Radioactive Waste Disposal Facility is available only to generators located in states affiliated with the Atlantic Compact. However, IP-1 is still able to dispose of Class A material at EnergySolutions' facility in Clive, Utah.

The costs reported for direct disposal (burial) in the estimate are based upon Entergy Nuclear Operations, Inc. current Life of Plant Disposal Agreement with EnergySolutions.[23] This facility was used as the destination for the majority of the waste volume generated by decommissioning (99.9%). EnergySolutions does not have a license to dispose of the more highly radioactive waste (Class B and C) generated in the dismantling of the reactor. As such, the disposal costs for this material (representing approximately 0.1% of the waste volume) were based upon Barnwell disposal rates, as a proxy.

Material exceeding Class C limits (limited to material closest to the reactor core and comprising approximately <0.1% of the total waste volume) is generally not suitable for shallow-land disposal. This material is packaged in the same multipurpose canister used for spent fuel storage/transport and designated for geologic disposal.

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/ recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to eliminate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimate reflects the savings from waste recovery/volume reduction. Costs for waste processing/reduction were also based upon existing agreements.

Disposition of the low-level radioactive waste generated from decommissioning operations (and cost basis) is summarized in Table 1.

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[23] General Services Agreement 10160239 between Entergy Nuclear Operations and EnergySolutions, June 2007

1.7.7 Site Conditions Following Decommissioning

The NRC will terminate (or amend) the site license when it determines that site remediation has been performed in accordance with the license termination plan, and that the final status survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process ends at this point. Building codes and state environmental regulations dictate the next step in the decommissioning process, as well as the owner's own future plans and commitments for the site.[24]

Only existing site structures are considered in the dismantling cost. The current analysis includes all structures as defined in the provided site plot plans.[25] The electrical switchyard remains after Indian Point is decommissioned in support of the regional transmission and distribution system. The Generation Support Building and IPEC Training Center remain in place for future use. Clean non-contaminated structures are removed to a nominal depth of three feet below grade. The voids are backfilled with clean debris and capped with soil. The site is then re-graded to conform to the adjacent landscape. Vegetation is established to inhibit erosion. These "non-radiological costs" are included in the total cost of decommissioning.

Site utility and service piping are abandoned in place. Electrical manholes are backfilled with suitable earthen material. Asphalt surfaces in the immediate vicinity of site buildings are broken up and the material used for fill, as required. The site access road remains in place.

1.7.8 Site Contamination

As indicated by the IPEC Groundwater Investigation Project,[26] it is likely that radionuclides in the soil has contaminated portions of the subsurface power block structures. As such, sub-grade surfaces of the following IP-1 structures were determined to be impacted by the contamination and removed:

- Reactor Containment

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24 "Entergy is committed to returning the Indian Point Unit 1, 2 and 3 facilities and the surrounding site to a "Greenfield" condition." Letter from Michael R. Kansler to Westchester County Attorney Alan D. Scheinkman, March 16, 2001

25 Entergy Nuclear Northeast "Buildings and Structures Identification Plan" ER-04-2-012, Rev. 01.

26 "Hydrogeologic Site Investigation Report," GZA GeoEnvironmental, Inc., January 2008

- Service & H.T. Switchgear
- Underground Utility Tunnel (included in Turbine Building activities)
- Chemical Systems
- Fuel Handling
- Nuclear Services
- Superheater, and
- Turbine Building

All other structures or buildings severely impacted in the decontamination process are removed to a nominal depth of three feet below grade.

Site remediation costs include the removal and disposition of approximately 1.26 million cubic feet of potentially contaminated soil within the boundaries of the IP-1 site.

1.8 ASSUMPTIONS

The following assumptions were made in the development of the estimate for decommissioning IP-1.

1.8.1 Estimating Basis

Decommissioning costs are reported in the year of projected expenditure; however, the values are provided in 2007 dollars. Costs are not inflated, escalated, or discounted over the periods of performance.

The estimates rely upon the physical plant inventory that was the basis for the 2002 analysis (updated to reflect any significant changes to the plant over the past five years).

The study follows the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

1.8.2 Release Criteria

This estimate assumes that the site will be remediated to the levels specified by the NRC and the State of New York. Specifically, "the total effective dose equivalent to the maximally exposed individual of the general public, from radioactive material remaining at a site after cleanup, shall be as low as reasonably achievable and less than 10 mrem above that received from background levels of radiation in any one year."[27]

1.8.3 Labor Costs

Entergy will manage the decontamination and dismantling of the nuclear unit in addition to maintaining site security, radiological health and safety, quality assurance and overall site administration during the decommissioning. Entergy will provide the supervisory staff needed to oversee the labor subcontractors, consultants, and specialty contractors engaged to perform the field work associated with the decontamination and dismantling efforts.

Personnel costs are based upon average salary information made available by Entergy. Overhead costs are included for site and corporate support, reduced commensurate with the staffing levels envisioned for the project.

Severance and retention costs are not included in the estimates. Reduction in the decommissioning organization is assumed to be handled through normal staffing processes (e.g., reassignment and outplacement).

The craft labor required to decontaminate and dismantle the nuclear unit is acquired through standard site contracting practices. The current cost of site labor is used as an estimating basis.

Security, with one exception, is provided by IP-2. Costs for maintaining one security post at IP-1 are included until 2015 when IP-3 ceases operation. After that time, IP-2 and/or IP-3 will provide any coverage required for the IP-1 portion of the site.

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27 NYSDEC Division of Solid & Hazardous Materials, Bureau of Hazardous Waste Radiation Management: Cleanup Guidelines for Soils Contaminated with Radioactive Materials (DSHM-RAD-05-01)

1.8.4 Design Conditions

Activation levels in the vessel and internal components are modeled using NUREG/CR-3474.[28] Estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the IPEC components, its reduced operating life, and anticipated period of decay. Additional short-lived isotopes were derived from CR-0130[29] and CR-0672,[30] and benchmarked to the long-lived values from CR-3474.

Activation of the reactor building structures was assumed to be confined to the biological shield.

1.8.5 General

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Entergy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that buyers prefer equipment stripped down to very specific requirements before they would consider purchase. This can require expensive rework after the equipment had been removed from its installed location. Since placing salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall cost of decommissioning, this analysis does not attempt to quantify the value that an owner may realize based upon those efforts.

It is assumed, for purposes of this analysis, that any value received from the sale of scrap generated in the dismantling process would be more than offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional cost for size reduction and preparation to meet "furnace ready"

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28 J.C. Evans et al., "Long-Lived Activation Products in Reactor Materials" NUREG/CR-3474, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, August 1984

29 R.I. Smith, G.J. Konzek, W.E. Kennedy, Jr., "Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station," NUREG/CR-0130 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, June 1978

30 H.D. Oak, et al., "Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station," NUREG/CR-0672 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, June 1980

conditions. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property is removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts are made available for alternative use.

Energy

For estimating purposes, the plant is assumed to be de-energized with temporary power run throughout the plant, as needed. Replacement power costs are used to calculate the cost of energy consumed during decommissioning for tooling, lighting, ventilation, and essential services.

Insurance

There is no separate budget item for insurance for IP-1. Continuing coverage (nuclear liability and property insurance) is provided by IP-2 policies.

Property Tax

Property taxes or fees in lieu of taxes are not included within the estimate.

Emergency Planning Fees

Emergency planning costs are estimated from FEMA, state, and local fees, as provided in the IPEC budget accounts. Maintenance and service costs are included with the annual fees.

Site Modifications

The perimeter fence and in-plant security barriers are moved, as appropriate, to conform to the site security plan in force during the various stages of the project.

2. RESULTS

The proposed decommissioning scenario, major cost contributors and schedule of annual expenditures are summarized in Figure 1 and in Tables 2 and 3. The summaries are based upon the 2007 detailed cost estimate provided in Appendix A. The cost elements are assigned to one of three subcategories: NRC License Termination, Spent Fuel Management, and Site Restoration. The subcategory "NRC License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR 50.75). The cost reported for this subcategory is generally sufficient to terminate the unit's operating license, recognizing that there may be some additional cost impact from spent fuel management. The cost for license termination is shown in Table 4.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel to the ISFSI. Costs for monitoring and eventual transfer of the 5 casks are included in the estimate for IP-2. The cost for spent fuel management is shown in Table 5.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Non-contaminated structures are removed to a depth of three feet and backfilled to conform to the local grade. Contaminated foundations are removed to bedrock. The cost for site restoration is shown in Table 6.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of costs is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., Asset Retirement Obligation determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, an owner may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

For purposes of this study, GTCC is packaged in the same canister used for spent fuel. The GTCC material is assumed to be shipped directly to a DOE facility as it is

generated (since the fuel has been removed from the site prior to the start of decommissioning and the ISFSI deactivated). While designated for disposal at the geologic repository along with the spent fuel, GTCC waste is still classified herein as low-level radioactive waste and, as such, included as a "License Termination" expense.

2.1 Decommissioning Trust Fund

The decommissioning trust fund, as reported in Entergy's latest status report (dated May 8, 2008) was $271.186 million, as of December 31, 2007.

2.2 Financial Assurance

Costs since Entergy has acquired IP-1 for maintaining the plant in safe-storage, performing necessary repairs and facility upkeep, supporting the groundwater investigation and containerizing the spent fuel and moving the spent fuel to the ISFSI have been paid for by site operations (i.e., there have been no disbursements from the decommissioning trust for IP-1 related site work). Operational funding of IP-1 related costs is expected to continue through 2013, the currently scheduled shutdown of IP-2.

Table 4 identifies the cost estimated for license termination in accordance with 10 CFR 50.75 (totaling approximately $547.457 million). The costs spent to date (from 2001) and budgeted through the 3rd quarter of 2013 is approximately $105.900 million. This cost is to be funded by operations. The remaining cost through 2073 (approximately $441.558 million) will be funded from the decommissioning trust.

Table 7 provides the details of the proposed funding plan for decommissioning IP-1 based on a 2% real rate of return on the decommissioning trust fund. As shown in Table 7, the current trust fund (as of December 31, 2007) is sufficient to accomplish the intended tasks and terminate the operating license for IP-1. The analysis also shows a surplus in the fund at the completion of decommissioning. This surplus could be made available to fund other activities at the site (e.g., spent fuel management and/or restoration activities), recognizing that the licensee would need to make the appropriate submittals for an exemption in accordance with 10 CFR 50.12 from the requirements of 10 CFR 50.82(a)(8)(i)(A) in order to use the decommissioning trust funds for non-decommissioning related expenses, as defined by 10 CFR 50.2.

FIGURE 1
SAFSTOR DECOMMISSIONING TIMELINE
(not to scale)

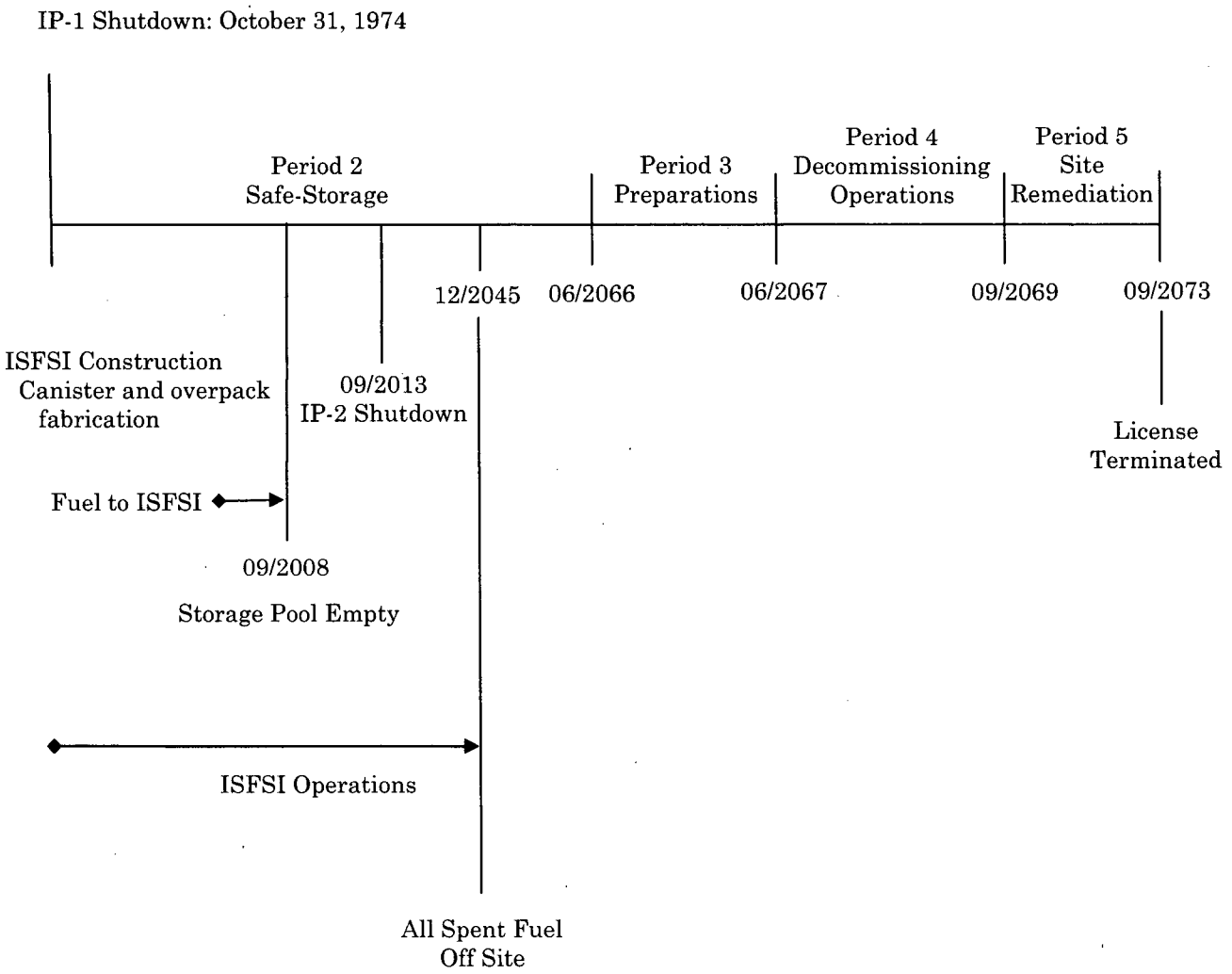

TABLE 1
Indian Point Energy Center, Unit 1
Low-Level Radioactive Waste Disposition

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	2,296,075	196,605,692
	Barnwell	B	1,740	176,728
	Barnwell	C	115	10,390
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	47	19,440
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	157,755	6,559,670
Total [2]				

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding.

TABLE 2
Indian Point Energy Center, Unit 1
Summary of Major Cost Contributors
(thousands, 2007 dollars)

	License Termination	Spent Fuel Management	Site Restoration	Total
Decontamination	8,442	-	-	8,442
Removal	81,600	-	20,195	101,794
Packaging	26,806	-	-	26,806
Transportation	39,940	-	-	39,940
Waste Disposal	88,373	-	-	88,373
Off-site Waste Processing (off-site)	14,031	-	-	14,031
Program Management [1]	77,872	-	6,917	84,789
Corporate A&G	-	-	-	-
Site O&M	10,622	-	-	10,622
Spent Fuel Management [2]	-	15,756	-	15,756
Insurance and Regulatory Fees	34,881	173	-	35,054
Energy	14,627	-	431	15,058
Radiological Characterization	11,764	-	-	11,764
Property Taxes	-	-	-	-
Miscellaneous Equipment	14,058	-	1	14,059
Environmental	33,464	-	-	33,464
IP-1 Project/Recurring Costs	90,978	-	-	90,978
Total	547,458	15,929	27,543	590,930

[1] Includes security and engineering
[2] Includes costs spent to date and an allocation of site emergency planning fees through 2015 (IP-3 shutdown)

TABLE 3
Indian Point Energy Center, Unit 1
Schedule of Annual Expenditures
Total Decommissioning Cost
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2001-2003	0	0	0	0	11,836	11,836
2004	0	0	0	0	9,450	9,450
2005	0	0	0	0	10,290	10,290
2006	0	0	0	0	20,630	20,630
2007	1,187	3,860	0	0	22,761	27,808
2008	2,716	0	180	0	9,430	12,326
2009	2,599	492	180	229	2,075	5,574
2010	2,599	492	180	229	2,075	5,574
2011	2,599	492	180	229	2,075	5,574
2012	2,599	492	180	229	2,075	5,574
2013	2,599	492	180	229	2,075	5,574
2014	2,599	492	180	229	2,075	5,574
2015	2,599	492	180	229	2,075	5,574
2016	461	270	227	21	1,676	2,656
2017	460	270	227	21	1,672	2,649
2018	460	270	227	21	1,672	2,649
2019	460	270	227	21	1,672	2,649
2020	461	270	227	21	1,676	2,656
2021	460	270	227	21	1,672	2,649
2022	460	270	227	21	1,672	2,649
2023	460	270	227	21	1,672	2,649
2024	461	270	227	21	1,676	2,656
2025	460	270	227	21	1,672	2,649
2026	460	270	227	21	1,672	2,649
2027	460	270	227	21	1,672	2,649
2028	461	270	227	21	1,676	2,656
2029	460	270	227	21	1,672	2,649
2030	460	270	227	21	1,672	2,649
2031	460	270	227	21	1,672	2,649
2032	461	270	227	21	1,676	2,656
2033	460	270	227	21	1,672	2,649
2034	460	270	227	21	1,672	2,649

TABLE 3 (continued)
Indian Point Energy Center, Unit 1
Schedule of Annual Expenditures
Total Decommissioning Cost
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2035	460	270	227	21	1,672	2,649
2036	461	270	227	21	1,676	2,656
2037	460	270	227	21	1,672	2,649
2038	460	270	227	21	1,672	2,649
2039	460	270	227	21	1,672	2,649
2040	461	270	227	21	1,676	2,656
2041	460	270	227	21	1,672	2,649
2042	460	270	227	21	1,672	2,649
2043	460	270	227	21	1,672	2,649
2044	461	270	227	21	1,676	2,656
2045	460	270	227	21	1,634	2,611
2046	460	270	227	21	849	1,826
2047	460	270	227	21	849	1,826
2048	461	270	227	21	852	1,831
2049	460	270	227	21	849	1,826
2050	460	270	227	21	849	1,826
2051	460	270	227	21	849	1,826
2052	461	270	227	21	852	1,831
2053	460	270	227	21	849	1,826
2054	460	270	227	21	849	1,826
2055	460	270	227	21	849	1,826
2056	461	270	227	21	852	1,831
2057	460	270	227	21	849	1,826
2058	460	270	227	21	849	1,826
2059	460	270	227	21	849	1,826
2060	461	270	227	21	852	1,831
2061	460	270	227	21	849	1,826
2062	460	270	227	21	849	1,826
2063	460	270	227	21	849	1,826
2064	461	270	227	21	852	1,831
2065	460	270	227	21	849	1,826

TABLE 3 (continued)
Indian Point Energy Center, Unit 1
Schedule of Annual Expenditures
Total Decommissioning Cost
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2066	15,659	2,146	227	32	1,101	19,165
2067	32,638	20,681	630	9,179	6,251	69,379
2068	40,433	35,867	820	48,098	24,092	149,310
2069	3,006	4,284	108	10,334	5,854	23,585
2070	3,006	4,284	108	10,334	5,854	23,585
2071	3,006	4,284	108	10,334	5,854	23,585
2072	3,022	4,241	110	10,195	5,950	23,519
2073	2,592	683	159	16	7,950	11,400
Total	148,459	97,267	15,058	101,167	228,979	590,930

TABLE 4
Indian Point Energy Center, Unit 1
Schedule of Annual Expenditures
License Termination Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2001-2003	0	0	0	0	11,836	11,836
2004	0	0	0	0	9,450	9,450
2005	0	0	0	0	10,290	10,290
2006	0	0	0	0	20,630	20,630
2007	0	0	0	0	22,761	22,761
2008	2,716	0	0	0	8,098	10,814
2009	2,599	492	206	229	711	4,236
2010	2,599	492	206	229	711	4,236
2011	2,599	492	206	229	711	4,236
2012	2,599	492	206	229	711	4,236
2013	2,599	492	206	229	711	4,236
2014	2,599	492	206	229	711	4,236
2015	2,599	492	206	229	711	4,236
2016	461	270	227	21	1,676	2,656
2017	460	270	227	21	1,672	2,649
2018	460	270	227	21	1,672	2,649
2019	460	270	227	21	1,672	2,649
2020	461	270	227	21	1,676	2,656
2021	460	270	227	21	1,672	2,649
2022	460	270	227	21	1,672	2,649
2023	460	270	227	21	1,672	2,649
2024	461	270	227	21	1,676	2,656
2025	460	270	227	21	1,672	2,649
2026	460	270	227	21	1,672	2,649
2027	460	270	227	21	1,672	2,649
2028	461	270	227	21	1,676	2,656
2029	460	270	227	21	1,672	2,649
2030	460	270	227	21	1,672	2,649
2031	460	270	227	21	1,672	2,649
2032	461	270	227	21	1,676	2,656
2033	460	270	227	21	1,672	2,649
2034	460	270	227	21	1,672	2,649

TABLE 4 (continued)
Indian Point Energy Center, Unit 1
Schedule of Annual Expenditures
License Termination Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2035	460	270	227	21	1,672	2,649
2036	461	270	227	21	1,676	2,656
2037	460	270	227	21	1,672	2,649
2038	460	270	227	21	1,672	2,649
2039	460	270	227	21	1,672	2,649
2040	461	270	227	21	1,676	2,656
2041	460	270	227	21	1,672	2,649
2042	460	270	227	21	1,672	2,649
2043	460	270	227	21	1,672	2,649
2044	461	270	227	21	1,676	2,656
2045	460	270	227	21	1,634	2,611
2046	460	270	227	21	849	1,826
2047	460	270	227	21	849	1,826
2048	461	270	227	21	852	1,831
2049	460	270	227	21	849	1,826
2050	460	270	227	21	849	1,826
2051	460	270	227	21	849	1,826
2052	461	270	227	21	852	1,831
2053	460	270	227	21	849	1,826
2054	460	270	227	21	849	1,826
2055	460	270	227	21	849	1,826
2056	461	270	227	21	852	1,831
2057	460	270	227	21	849	1,826
2058	460	270	227	21	849	1,826
2059	460	270	227	21	849	1,826
2060	461	270	227	21	852	1,831
2061	460	270	227	21	849	1,826
2062	460	270	227	21	849	1,826
2063	460	270	227	21	849	1,826
2064	461	270	227	21	852	1,831
2065	460	270	227	21	849	1,826

TABLE 4 (continued)
Indian Point Energy Center, Unit 1
Schedule of Annual Expenditures
License Termination Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2066	15,393	2,146	227	32	1,101	18,899
2067	31,608	20,646	630	9,179	6,251	68,313
2068	39,716	35,767	818	48,098	24,092	148,490
2069	560	468	0	10,334	5,854	17,216
2070	560	468	0	10,334	5,854	17,216
2071	560	468	0	10,334	5,854	17,216
2072	609	477	3	10,195	5,950	17,235
2073	2,592	683	159	16	7,950	11,400
Total	135,507	78,060	14,627	101,167	218,096	547,457

TABLE 5
Indian Point Energy Center, Unit 1
Schedule of Annual Expenditures
Spent Fuel Management Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other *	Yearly Totals
2001-2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
2007	1,187	3,860	0	0	0	5,047
2008	0	0	0	0	1,512	1,512
2009	0	0	0	0	1,339	1,339
2010	0	0	0	0	1,339	1,339
2011	0	0	0	0	1,339	1,339
2012	0	0	0	0	1,339	1,339
2013	0	0	0	0	1,339	1,339
2014	0	0	0	0	1,339	1,339
2015	0	0	0	0	1,339	1,339
Total	1,187	3,860	0	0	10,882	15,929

* Prorated share of site Emergency Planning Fees

TABLE 6
Indian Point Energy Center, Unit 1
Schedule of Annual Expenditures
Site Restoration Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2001-2065	0	0	0	0	0	0
2066	266	0	0	0	0.0	266
2067	1,030	36	0	0	0.0	1,066
2068	717	100	2	0	0.0	820
2069	2,446	3,816	108	0	0.2	6,369
2070	2,446	3,816	108	0	0.2	6,369
2071	2,446	3,816	108	0	0.2	6,369
2072	2,413	3,764	106	0	0.2	6,284
2073	0	0	0	0	0	0
Total	11,764	15,347	431	0	0.85	27,543

TABLE 7
Funding Requirements for License Termination Coordinated with IP-2 2013 Shutdown and 60-Year SAFSTOR

Basis Year		2007	
Fund Balance		$271.186	(millions)
Annual Escalation		0.00%	
Annual Earnings		2.00%	
	A	B	C
Year	License Termination Cost (millions)	Escalated License Termination Cost Escalated at 0% (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2001	$105.900 million spent to date and budgeted through 3rd quarter of 2013 (currently scheduled date for shutdown of IP-2) funded by operations		
2002			
2003			
2004			
2005			
2006			
2007			271.186
2008			276.610
2009			282.142
2010			287.785
2011			293.540
2012			299.411
2013	1.059	1.059	304.340
2014	4.236	4.236	306.191
2015	4.236	4.236	308.079
2016	2.656	2.656	311.585
2017	2.649	2.649	315.167
2018	2.649	2.649	318.822
2019	2.649	2.649	322.549
2020	2.656	2.656	326.344
2021	2.649	2.649	330.222
2022	2.649	2.649	334.177
2023	2.649	2.649	338.212
2024	2.656	2.656	342.320
2025	2.649	2.649	346.518
2026	2.649	2.649	350.799
2027	2.649	2.649	355.166
2028	2.656	2.656	359.613

TABLE 7 (continued)
Funding Requirements for License Termination
Coordinated with IP-2 2013 Shutdown and 60-Year SAFSTOR

Basis Year		2007	
Fund Balance		$271.186	(millions)
Annual Escalation		0.00%	
Annual Earnings		2.00%	
	A	B	C
Year	License Termination Cost (millions)	Escalated License Termination Cost Escalated at 0% (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2029	2.649	2.649	364.157
2030	2.649	2.649	368.791
2031	2.649	2.649	373.518
2032	2.656	2.656	378.332
2033	2.649	2.649	383.250
2034	2.649	2.649	388.266
2035	2.649	2.649	393.382
2036	2.656	2.656	398.593
2037	2.649	2.649	403.916
2038	2.649	2.649	409.346
2039	2.649	2.649	414.884
2040	2.656	2.656	420.525
2041	2.649	2.649	426.287
2042	2.649	2.649	432.163
2043	2.649	2.649	438.158
2044	2.656	2.656	444.265
2045	2.611	2.611	450.539
2046	1.826	1.826	457.724
2047	1.826	1.826	465.052
2048	1.831	1.831	472.523
2049	1.826	1.826	480.147
2050	1.826	1.826	487.924
2051	1.826	1.826	495.856
2052	1.831	1.831	503.943
2053	1.826	1.826	512.195
2054	1.826	1.826	520.613
2055	1.826	1.826	529.200
2056	1.831	1.831	537.953

TABLE 7 (continued)
Funding Requirements for License Termination
Coordinated with IP-2 2013 Shutdown and 60-Year SAFSTOR

Basis Year		2007	
Fund Balance		$271.186	(millions)
Annual Escalation		0.00%	
Annual Earnings		2.00%	
	A	B	C
Year	License Termination Cost (millions)	Escalated License Termination Cost Escalated at 0% (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2057	1.826	1.826	546.886
2058	1.826	1.826	555.997
2059	1.826	1.826	565.291
2060	1.831	1.831	574.766
2061	1.826	1.826	584.435
2062	1.826	1.826	594.298
2063	1.826	1.826	604.358
2064	1.831	1.831	614.614
2065	1.826	1.826	625.081
2066	18.899	18.899	618.683
2067	68.313	68.313	562.744
2068	148.490	148.490	425.509
2069	17.216	17.216	416.803
2070	17.216	17.216	407.923
2071	17.216	17.216	398.865
2072	17.235	17.235	389.608
2073	11.400	11.400	386.000
	441.549 [1]	441.549	

Notes:

[1] Does not include the $105.900 million funded by operations

Calculations:

Column B = (A)*(1+.00)^(current year – 2007) or for 0%, B = A
Column C = (Previous year's fund balance) * (1 + .02) – B (current year's decommissioning expenditures)

APPENDIX A

2007 DETAILED COST ANALYSIS

Table A
Indian Point Energy Center, Unit 1
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 0a - Pre-Shutdown Early Planning																					
Period 0a Direct Decommissioning Activities																					
Period 0a Additional Costs																					
0a.2.1	IP1 Projects 2000-2007	-	-	-	-	-	-	51,123	-	51,123	51,123	-	-	-	-	-	-	-	-	-	-
0a.2.2	IP1 Recurring Costs 2000-2007	-	-	-	-	-	-	23,844	-	23,844	23,844	-	-	-	-	-	-	-	-	-	-
0a.2.3	IP1 Projects 2008	-	-	-	-	-	-	6,647	-	6,647	6,647	-	-	-	-	-	-	-	-	-	-
0a.2.4	IP1 Recurring Costs 2008-License Termination	-	-	-	-	-	200	3,967	-	4,167	4,167	-	-	-	-	-	-	-	-	-	-
0a.2.5	IP1 Recurring Costs 2008-Spent Fuel Mgmnt	-	-	-	-	-	-	1,512	-	1,512	-	1,512	-	-	-	-	-	-	-	-	-
0a.2.6	IPEC Dry Cask Infrastructure	-	-	-	-	-	-	5,047	-	5,047	-	5,047	-	-	-	-	-	-	-	-	-
0a.2.7	IP1 Recurring Costs 2009-2015	-	-	-	-	-	1,400	6,836	-	8,236	8,236	-	-	-	-	-	-	-	-	-	-
0a.2.8	IP1 Ground Water Program 2009-2015	-	-	-	-	-	-	3,222	-	3,222	3,222	-	-	-	-	-	-	-	-	-	-
0a.2.9	Emergency Planning 2009-2005	-	-	-	-	-	-	9,370	-	9,370	-	9,370	-	-	-	-	-	-	-	-	-
0a.2.10	Utility Staffing 2009-2015	-	-	-	-	-	-	18,191	-	18,191	18,191	-	-	-	-	-	-	-	-	-	-
0a.0	TOTAL PERIOD 0a COST	-	-	-	-	-	1,600	129,760	-	131,359	115,430	15,929	-	-	-	-	-	-	-	-	-
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	180	27	206	206	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	3,768	942	4,710	4,710	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	3,948	969	4,917	4,917	-	-	-	-	-	-	-	-	-	-
Period 2b Additional Costs																					
2b.2.1	Emergency Planning Fees	-	-	-	-	-	-	22,414	2,241	24,655	24,655	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	-	-	-	-	-	22,414	2,241	24,655	24,655	-	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	2,622	-	-	-	-	-	656	3,278	3,278	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	51	34	-	501	-	135	722	722	-	-	-	11,086	-	-	-	221,729	88	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	5,913	887	6,800	6,800	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	5,183	518	5,701	5,701	-	-	-	-	-	-	-	-	-	-
2b.4.7	Site O&M	-	-	-	-	-	-	3,480	522	4,002	4,002	-	-	-	-	-	-	-	-	-	-
2b.4.8	Environmental	-	-	-	-	-	-	13,644	2,047	15,690	15,690	-	-	-	-	-	-	-	-	-	-
2b.4.9	Utility Staff Cost	-	-	-	-	-	-	11,861	1,779	13,640	13,640	-	-	-	-	-	-	-	-	-	250,103
2b.4	Subtotal Period 2b Period-Dependent Costs	-	2,622	51	34	-	501	40,081	6,544	49,833	49,833	-	-	-	11,086	-	-	-	221,729	88	250,103
2b.0	TOTAL PERIOD 2b COST	-	2,622	51	34	-	501	66,442	9,754	79,405	79,405	-	-	-	11,086	-	-	-	221,729	88	250,103
PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Quarterly Inspection									a											
2c.1.2	Semi-annual environmental survey									a											
2c.1.3	Prepare reports									a											
2c.1.4	Bituminous roof replacement	-	-	-	-	-	-	123	18	141	141	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	2,582	645	3,227	3,227	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	2,705	664	3,369	3,369	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A
Indian Point Energy Center, Unit 1
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes: Class A Cu. Feet	Burial Volumes: Class B Cu. Feet	Burial Volumes: Class C Cu. Feet	Burial Volumes: GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2c Period-Dependent Costs (continued)																					
2c.4.3	Health physics supplies	-	1,797	-	-	-	-	-	449	2,246	2,246	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	35	23	-	343	-	93	494	494	-	-	-	7,596	-	-	-	151,919	60	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	4,052	608	4,659	4,659	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	3,551	355	3,906	3,906	-	-	-	-	-	-	-	-	-	-
2c.4.7	Site O&M	-	-	-	-	-	-	2,384	358	2,742	2,742	-	-	-	-	-	-	-	-	-	-
2c.4.8	Environmental	-	-	-	-	-	-	9,348	1,402	10,750	10,750	-	-	-	-	-	-	-	-	-	-
2c.4.9	Utility Staff Cost	-	-	-	-	-	-	8,127	1,219	9,346	9,346	-	-	-	-	-	-	-	-	-	171,360
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,797	35	23	-	343	27,462	4,484	34,144	34,144	-	-	-	7,596	-	-	-	151,919	60	171,360
2c.0	TOTAL PERIOD 2c COST	-	1,797	35	23	-	343	30,167	5,148	37,513	37,513	-	-	-	7,596	-	-	-	151,919	60	171,360
PERIOD 2 TOTALS		-	4,419	85	58	-	844	96,609	14,902	116,918	116,918	-	-	-	18,682	-	-	-	373,648	148	421,463
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	61	9	70	70	-	-	-	-	-	-	-	-	-	928
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	214	32	246	246	-	-	-	-	-	-	-	-	-	3,284
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	714
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	61	9	70	70	-	-	-	-	-	-	-	-	-	928
3a.1.6	Define major work sequence	-	-	-	-	-	-	349	52	402	402	-	-	-	-	-	-	-	-	-	5,355
3a.1.7	Perform SER and EA	-	-	-	-	-	-	144	22	166	166	-	-	-	-	-	-	-	-	-	2,213
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	233	35	268	268	-	-	-	-	-	-	-	-	-	3,570
3a.1.9	Prepare/submit License Termination Plan	-	-	-	-	-	-	191	29	219	219	-	-	-	-	-	-	-	-	-	2,925
3a.1.10	Receive NRC approval of termination plan									a											
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	343	51	395	355	-	39	-	-	-	-	-	-	-	5,262
3a.1.11.2	Plant systems	-	-	-	-	-	-	194	29	223	201	-	22	-	-	-	-	-	-	-	2,975
3a.1.11.3	Reactor internals	-	-	-	-	-	-	331	50	380	380	-	-	-	-	-	-	-	-	-	5,069
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	303	45	348	348	-	-	-	-	-	-	-	-	-	4,641
3a.1.11.5	Biological shield	-	-	-	-	-	-	23	3	27	27	-	-	-	-	-	-	-	-	-	357
3a.1.11.6	Steam generators	-	-	-	-	-	-	145	22	167	167	-	-	-	-	-	-	-	-	-	2,228
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	74	11	86	43	-	43	-	-	-	-	-	-	-	1,142
3a.1.11.8	Main Turbine	-	-	-	-	-	-	19	3	21	-	-	21	-	-	-	-	-	-	-	286
3a.1.11.9	Main Condensers	-	-	-	-	-	-	19	3	21	-	-	21	-	-	-	-	-	-	-	286
3a.1.11.10	Plant structures & buildings	-	-	-	-	-	-	145	22	167	84	-	84	-	-	-	-	-	-	-	2,228
3a.1.11.11	Waste management	-	-	-	-	-	-	214	32	246	246	-	-	-	-	-	-	-	-	-	3,284
3a.1.11.12	Facility & site closeout	-	-	-	-	-	-	42	6	48	24	-	24	-	-	-	-	-	-	-	643
3a.1.11	Total	-	-	-	-	-	-	1,852	278	2,130	1,875	-	255	-	-	-	-	-	-	-	28,401
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	112	17	129	129	-	-	-	-	-	-	-	-	-	1,714
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	2,419	363	2,782	2,782	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	65	10	75	75	-	-	-	-	-	-	-	-	-	1,000
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,048	307	2,355	2,355	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	57	9	66	66	-	-	-	-	-	-	-	-	-	878
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	7,852	1,178	9,030	8,775	-	255	-	-	-	-	-	-	-	51,910
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	2,218	665	2,883	2,883	-	-	-	-	-	-	-	-	-	-
3a.2	Subtotal Period 3a Additional Costs	-	-	-	-	-	-	2,218	665	2,883	2,883	-	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A
Indian Point Energy Center, Unit 1
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3a Period-Dependent Costs (continued)																					
3a.4.3	Health physics supplies	-	198	-	-	-	-	-	50	248	248	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	237	-	-	-	-	-	36	273	273	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	1	1	-	10	-	3	15	15	-	-	-	226	-	-	-	4,518	2	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	101	15	116	116	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	88	9	97	97	-	-	-	-	-	-	-	-	-	-
3a.4.8	Site O&M	-	-	-	-	-	-	237	35	272	272	-	-	-	-	-	-	-	-	-	-
3a.4.9	Environmental	-	-	-	-	-	-	232	35	267	267	-	-	-	-	-	-	-	-	-	-
3a.4.10	Utility Staff Cost	-	-	-	-	-	-	4,127	619	4,746	4,746	-	-	-	-	-	-	-	-	-	69,086
3a.4	Subtotal Period 3a Period-Dependent Costs	-	435	1	1	-	10	4,784	801	6,032	6,032	-	-	-	226	-	-	-	4,518	2	69,086
3a.0	TOTAL PERIOD 3a COST	-	435	1	1	-	10	14,854	2,644	17,945	17,690	-	255	-	226	-	-	-	4,518	2	120,995
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	336	50	387	348	-	39	-	-	-	-	-	-	-	3,379
3b.1.1.2	Reactor internals	-	-	-	-	-	-	178	27	204	204	-	-	-	-	-	-	-	-	-	1,785
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	96	14	110	28	-	83	-	-	-	-	-	-	-	964
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	714
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	714
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	714
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	258	39	297	297	-	-	-	-	-	-	-	-	-	2,592
3b.1.1.8	Facility closeout	-	-	-	-	-	-	85	13	98	49	-	49	-	-	-	-	-	-	-	857
3b.1.1.9	Missile shields	-	-	-	-	-	-	32	5	37	37	-	-	-	-	-	-	-	-	-	321
3b.1.1.10	Biological shield	-	-	-	-	-	-	85	13	98	98	-	-	-	-	-	-	-	-	-	857
3b.1.1.11	Steam generators	-	-	-	-	-	-	327	49	376	376	-	-	-	-	-	-	-	-	-	3,284
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	71	11	82	41	-	41	-	-	-	-	-	-	-	714
3b.1.1.13	Main Turbine	-	-	-	-	-	-	111	17	127	-	-	127	-	-	-	-	-	-	-	1,114
3b.1.1.14	Main Condensers	-	-	-	-	-	-	111	17	127	-	-	127	-	-	-	-	-	-	-	1,114
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	194	29	223	201	-	22	-	-	-	-	-	-	-	1,949
3b.1.1.16	Reactor building	-	-	-	-	-	-	194	29	223	201	-	22	-	-	-	-	-	-	-	1,949
3b.1.1	Total	-	-	-	-	-	-	2,291	344	2,635	2,124	-	511	-	-	-	-	-	-	-	23,022
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	2,291	344	2,635	2,124	-	511	-	-	-	-	-	-	-	23,022
Period 3b Additional Costs																					
3b.2.1	Asbestos Abatement	-	1,915	1	124	-	326	-	579	2,944	2,944	-	-	-	11,087	-	-	-	144,131	20,864	-
3b.2.2	Staff relocations expenses	-	-	-	-	-	-	1,639	246	1,885	1,885	-	-	-	-	-	-	-	-	-	-
3b.2	Subtotal Period 3b Additional Costs	-	1,915	1	124	-	326	1,639	825	4,829	4,829	-	-	-	11,087	-	-	-	144,131	20,864	-
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	959	-	-	-	-	-	-	144	1,103	1,103	-	-	-	-	-	-	-	-	-	-
3b.3.2	Small tool allowance	-	33	-	-	-	-	-	5	38	38	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	957	-	-	-	-	-	143	1,100	1,100	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	959	989	-	-	-	-	-	292	2,241	2,241	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	30	-	-	-	-	-	-	7	37	37	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	292	-	-	-	-	-	73	365	365	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	235	-	-	-	-	-	35	270	270	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	1	1	-	10	-	3	15	15	-	-	-	223	-	-	-	4,469	2	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	99	15	114	114	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	87	9	96	96	-	-	-	-	-	-	-	-	-	-
3b.4.9	Site O&M	-	-	-	-	-	-	234	35	269	269	-	-	-	-	-	-	-	-	-	-

Table A
Indian Point Energy Center, Unit 1
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Period-Dependent Costs (continued)																					
3b.4.10	Environmental	-	-	-	-	-	-	229	34	264	264	-	-	-	-	-	-	-	-	-	-
3b.4.11	*Utility Staff Cost*	-	-	-	-	-	-	4,082	612	4,695	4,695	-	-	-	-	-	-	-	-	-	68,343
3b.4	Subtotal Period 3b Period-Dependent Costs	30	527	1	1	-	10	4,732	824	6,125	6,125	-	-	-	223	-	-	-	4,469	2	68,343
3b.0	TOTAL PERIOD 3b COST	989	3,431	2	124	-	336	8,663	2,285	15,829	15,319	-	511	-	11,310	-	-	-	148,600	20,866	91,364
PERIOD 3 TOTALS		989	3,867	3	125	-	346	23,517	4,929	33,775	33,009	-	766	-	11,536	-	-	-	153,118	20,868	212,360
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	69	232	53	51	260	372	-	238	1,275	1,275	-	-	1,260	1,260	-	-	-	292,298	4,535	-
4a.1.1.2	Pressurizer Relief Tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a.1.1.3	Reactor Coolant Pumps & Motors	9	107	53	16	100	114	-	83	483	483	-	-	870	753	-	-	-	100,540	2,035	-
4a.1.1.4	Pressurizer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a.1.1.5	Steam Generators	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	42	115	223	68	52	156	-	129	785	785	-	-	753	2,415	-	-	-	91,841	2,222	-
4a.1.1.7	Reactor Vessel Internals	35	2,270	1,523	293	-	1,531	121	2,958	8,731	8,731	-	-	-	411	501	115	-	78,135	13,300	664
4a.1.1.8	Vessel & Internals GTCC Disposal	-	-	-	-	-	1,075	-	161	1,237	1,237	-	-	-	-	-	-	47	19,440	-	-
4a.1.1.9	Reactor Vessel	-	5,835	648	306	-	4,391	121	6,828	18,129	18,129	-	-	-	5,337	1,239	-	-	654,068	13,300	664
4a.1.1	Totals	156	8,560	2,501	734	412	7,640	241	10,397	30,642	30,642	-	-	2,884	10,177	1,740	115	47	1,236,322	35,392	1,328
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	188	52	17	208	-	-	86	551	551	-	-	2,481	-	-	-	-	111,651	2,692	-
4a.1.3	Main Condensers	-	465	18	6	70	-	-	130	689	689	-	-	840	-	-	-	-	37,821	6,671	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor Containment	-	10,115	-	-	-	-	-	1,517	11,632	11,632	-	-	-	-	-	-	-	-	108,763	-
4a.1.4.2	Chemical Systems Building	-	3,632	-	-	-	-	-	545	4,177	4,177	-	-	-	-	-	-	-	-	34,588	-
4a.1.4.3	Fuel Handling Building	-	207	-	-	-	-	-	31	238	238	-	-	-	-	-	-	-	-	1,839	-
4a.1.4.4	Nuclear Service Building	-	692	-	-	-	-	-	104	796	796	-	-	-	-	-	-	-	-	6,599	-
4a.1.4	Totals	-	14,647	-	-	-	-	-	2,197	16,844	16,844	-	-	-	-	-	-	-	-	149,788	-
Disposal of Plant Systems																					
4a.1.5.1	Electrical - Clean	-	135	-	-	-	-	-	20	155	-	-	155	-	-	-	-	-	-	1,981	-
4a.1.5.2	Plant Air	-	92	2	7	81	-	-	36	218	218	-	-	1,075	-	-	-	-	43,674	1,370	-
4a.1.5.3	Plant Heating	-	48	-	-	-	-	-	7	56	-	-	56	-	-	-	-	-	-	726	-
4a.1.5.4	River Water	-	123	-	-	-	-	-	18	141	-	-	141	-	-	-	-	-	-	1,831	-
4a.1.5.5	Service Water	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	355	-
4a.1.5.6	Turbine	-	89	3	13	161	-	-	49	315	315	-	-	2,131	-	-	-	-	86,526	1,290	-
4a.1.5.7	Well Water	-	252	-	-	-	-	-	38	289	-	-	289	-	-	-	-	-	-	3,667	-
4a.1.5	Totals	-	762	5	19	242	-	-	172	1,201	533	-	668	3,206	-	-	-	-	130,200	11,222	-
4a.1.6	Scaffolding in support of decommissioning	-	1,357	17	6	62	10	-	354	1,805	1,805	-	-	739	46	-	-	-	37,366	21,936	-
4a.1	Subtotal Period 4a Activity Costs	156	25,980	2,593	782	994	7,650	241	13,336	51,732	51,063	-	668	10,150	10,223	1,740	115	47	1,553,359	227,702	1,328
Period 4a Collateral Costs																					
4a.3.1	Process liquid waste	5	-	3	15	-	10	-	7	40	40	-	-	-	37	-	-	-	2,235	7	-
4a.3.2	Small tool allowance	-	338	-	-	-	-	-	51	389	350	-	39	-	-	-	-	-	-	-	-
4a.3.3	Survey and Release of Scrap Metal	-	-	-	-	-	-	986	296	1,282	1,282	-	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	5	338	3	15	-	10	986	354	1,711	1,672	-	39	-	37	-	-	-	2,235	7	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	37	-	-	-	-	-	-	9	46	46	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A
Indian Point Energy Center, Unit 1
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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4a Period-Dependent Costs (continued)																					
4a.4.3	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,313	-	-	-	-	-	328	1,642	1,642	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	1,439	-	-	-	-	-	216	1,655	1,655	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	8	5	-	75	-	20	108	108	-	-	-	1,658	-	-	-	33,169	13	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	562	84	646	646	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	109	11	120	120	-	-	-	-	-	-	-	-	-	-
4a.4.9	Site O&M	-	-	-	-	-	-	294	44	338	338	-	-	-	-	-	-	-	-	-	-
4a.4.10	Radwaste Processing Equipment/Services	-	-	-	-	-	-	235	35	271	271	-	-	-	-	-	-	-	-	-	-
4a.4.11	Environmental	-	-	-	-	-	-	288	43	331	331	-	-	-	-	-	-	-	-	-	-
4a.4.12	Utility Staff Cost	-	-	-	-	-	-	7,561	1,134	8,695	8,695	-	-	-	-	-	-	-	-	-	126,060
4a.4	Subtotal Period 4a Period-Dependent Costs	37	2,752	8	5	-	75	9,050	1,926	13,853	13,853	-	-	-	1,658	-	-	-	33,169	13	126,060
4a.0	TOTAL PERIOD 4a COST	198	29,070	2,603	802	994	7,735	10,277	15,615	67,295	66,587	-	707	10,150	11,919	1,740	115	47	1,588,763	227,723	127,388
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	313	36	96	43	-	338	-	266	1,092	1,092	-	-	-	1,546	-	-	-	138,718	603	-
Disposal of Plant Systems																					
4b.1.2.1	Cleanup & Condensate Demineralizer	-	182	3	11	137	-	-	68	400	400	-	-	1,810	-	-	-	-	73,494	2,593	-
4b.1.2.2	Control Rod Hydraulic System	-	224	2	8	94	-	-	71	399	399	-	-	1,249	-	-	-	-	50,719	2,937	-
4b.1.2.3	Cooling Water	-	285	8	29	359	-	-	130	811	811	-	-	4,759	-	-	-	-	193,258	4,093	-
4b.1.2.4	Electrical - Contaminated	-	58	1	2	26	-	-	19	105	105	-	-	342	-	-	-	-	13,892	838	-
4b.1.2.5	Electrical - RCA	-	934	20	73	910	-	-	383	2,320	2,320	-	-	12,048	-	-	-	-	489,258	13,381	-
4b.1.2.6	Fire Protection	-	52	-	-	-	-	-	8	60	-	-	60	-	-	-	-	-	-	778	-
4b.1.2.7	Fire Protection - RCA	-	21	0	2	21	-	-	9	53	53	-	-	274	-	-	-	-	11,122	290	-
4b.1.2.8	Floor Drain Tank & Laundry Waste	-	94	2	6	73	-	-	35	209	209	-	-	962	-	-	-	-	39,087	1,328	-
4b.1.2.9	Fuel & Lube Oil	-	191	6	20	254	-	-	89	560	560	-	-	3,361	-	-	-	-	136,476	2,734	-
4b.1.2.10	Fuel Oil Tanks	-	412	-	-	-	-	-	62	473	-	-	473	-	-	-	-	-	-	5,920	-
4b.1.2.11	Improvements Radiation Detection Unit	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
4b.1.2.12	Liquid Waste Storage & Hold-Up Tanks	-	107	1	5	67	-	-	38	218	218	-	-	886	-	-	-	-	35,976	1,483	-
4b.1.2.13	Main Steam & Condensate	-	1,492	87	329	4,110	-	-	1,048	7,066	7,066	-	-	54,411	-	-	-	-	2,209,667	21,743	-
4b.1.2.14	Misc Service Piping	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	78	-
4b.1.2.15	Nuclear Steam Supply	-	198	8	31	387	-	-	113	738	738	-	-	5,130	-	-	-	-	208,325	2,912	-
4b.1.2.16	Plant Heating - RCA	-	382	8	29	359	-	-	154	931	931	-	-	4,746	-	-	-	-	192,742	5,375	-
4b.1.2.17	Plant Heating Contaminated	-	131	2	8	98	-	-	49	287	287	-	-	1,299	-	-	-	-	52,747	1,715	-
4b.1.2.18	REDT & Fuel Handling Water Treatment	-	230	5	20	248	-	-	98	601	601	-	-	3,282	-	-	-	-	133,264	3,312	-
4b.1.2.19	Radwaste & Waste Demin Tanks	-	407	7	27	339	-	-	158	939	939	-	-	4,491	-	-	-	-	182,398	5,806	-
4b.1.2.20	Service Water - RCA	-	188	7	25	318	-	-	99	638	638	-	-	4,213	-	-	-	-	171,087	2,691	-
4b.1.2.21	Sludge Handling Resin Stor & Waste Conc	-	154	3	11	141	-	-	61	370	370	-	-	1,863	-	-	-	-	75,643	2,206	-
4b.1.2.22	Waste Neutralizer & Waste Collector Tank	-	110	2	9	107	-	-	45	273	273	-	-	1,415	-	-	-	-	57,471	1,595	-
4b.1.2.23	Waste Treament	-	1,289	37	140	1,749	-	-	609	3,825	3,825	-	-	23,157	-	-	-	-	940,414	18,680	-
4b.1.2	Totals	-	7,144	210	784	9,797	-	-	3,347	21,283	20,744	-	539	129,696	-	-	-	-	5,267,039	102,498	-
4b.1.3	Scaffolding in support of decommissioning	-	2,035	25	9	93	15	-	530	2,708	2,708	-	-	1,108	69	-	-	-	56,049	32,904	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor Containment	1,336	3,434	5,873	4,576	669	7,263	-	4,716	27,867	27,867	-	-	8,859	277,680	-	-	-	28,116,760	68,101	-
4b.1.4.2	Chemical Systems Building	771	2,146	4,178	3,234	92	5,152	-	3,126	18,699	18,699	-	-	1,223	197,917	-	-	-	19,839,890	41,698	-
4b.1.4.3	Fuel Handling Building	109	1,850	3,985	3,082	27	4,912	-	2,610	16,576	16,576	-	-	362	188,869	-	-	-	18,901,140	28,298	-
4b.1.4.4	Nuclear Service Building	270	656	1,284	994	26	1,583	-	977	5,791	5,791	-	-	346	60,836	-	-	-	6,097,243	13,247	-
4b.1.4.5	Service Building & H. T. Switchgear	-	169	368	285	-	454	-	235	1,510	1,510	-	-	-	17,456	-	-	-	1,745,550	2,436	-
4b.1.4.6	Superheater Building	482	888	1,940	1,499	-	2,390	-	1,479	8,678	8,678	-	-	-	91,935	-	-	-	9,193,500	19,903	-
4b.1.4.7	Turbine Building	260	1,329	2,904	2,245	-	3,579	-	1,984	12,302	12,302	-	-	-	137,660	-	-	-	13,765,950	23,032	-
4b.1.4	Totals	3,229	10,471	20,532	15,916	815	25,334	-	15,128	91,424	91,424	-	-	10,790	972,352	-	-	-	97,660,020	196,715	-
4b.1	Subtotal Period 4b Activity Costs	3,542	19,687	20,862	16,752	10,704	25,687	-	19,272	116,507	115,968	-	539	141,594	973,967	-	-	-	103,121,800	332,720	-

Table A
Indian Point Energy Center, Unit 1
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4b Additional Costs																					
4b.2.1	Final Site Survey Program Management	-	-	-	-	-	-	652	196	848	848	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	AOC PCB Soil Remediation	-	37	12	76	-	218	-	76	420	420	-	-	-	12,181	-	-	-	1,280,000	320	-
4b.2	Subtotal Period 4b Additional Costs	-	37	12	76	-	218	652	272	1,267	1,267	-	-	-	12,181	-	-	-	1,280,000	320	6,240
Period 4b Collateral Costs																					
4b.3.1	Process liquid waste	24	-	13	72	-	51	-	37	198	198	-	-	-	185	-	-	-	11,098	36	-
4b.3.2	Small tool allowance	-	443	-	-	-	-	-	66	509	509	-	-	-	-	-	-	-	-	-	-
4b.3.3	Decommissioning Equipment Disposition	-	-	135	59	502	82	-	118	896	896	-	-	6,000	373	-	-	-	303,507	88	-
4b.3.4	Survey and Release of Scrap Metal	-	-	-	-	-	-	966	290	1,255	1,255	-	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	24	443	148	132	502	133	966	511	2,859	2,859	-	-	6,000	558	-	-	-	314,605	124	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,333	-	-	-	-	-	-	333	1,666	1,666	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	1,863	-	-	-	-	-	466	2,329	2,329	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	1,929	-	-	-	-	-	289	2,218	2,218	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	21	14	-	204	-	55	293	293	-	-	-	4,503	-	-	-	90,057	36	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	599	90	689	689	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	148	15	163	163	-	-	-	-	-	-	-	-	-	-
4b.4.9	Site O&M	-	-	-	-	-	-	397	60	456	456	-	-	-	-	-	-	-	-	-	-
4b.4.10	Radwaste Processing Equipment/Services	-	-	-	-	-	-	318	48	365	365	-	-	-	-	-	-	-	-	-	-
4b.4.11	Environmental	-	-	-	-	-	-	389	58	447	447	-	-	-	-	-	-	-	-	-	-
4b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,331	800	6,131	6,131	-	-	-	-	-	-	-	-	-	95,383
4b.4	Subtotal Period 4b Period-Dependent Costs	1,333	3,792	21	14	-	204	7,182	2,213	14,759	14,759	-	-	-	4,503	-	-	-	90,057	36	95,383
4b.0	TOTAL PERIOD 4b COST	4,898	23,959	21,043	16,974	11,207	26,243	8,800	22,269	135,392	134,853	-	539	147,594	991,209	-	-	-	104,806,500	333,200	101,623
PERIOD 4e - License Termination																					
Period 4e Direct Decommissioning Activities																					
4e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	152	46	198	198	-	-	-	-	-	-	-	-	-	-
4e.1.2	Terminate license									a											
4e.1	Subtotal Period 4e Activity Costs	-	-	-	-	-	-	152	46	198	198	-	-	-	-	-	-	-	-	-	-
Period 4e Additional Costs																					
4e.2.1	Final Site Survey	-	-	-	-	-	-	4,076	1,223	5,298	5,298	-	-	-	-	-	-	-	-	56,068	3,120
4e.2.2	Staff relocations expenses	-	-	-	-	-	-	1,639	246	1,885	1,885	-	-	-	-	-	-	-	-	-	-
4e.2	Subtotal Period 4e Additional Costs	-	-	-	-	-	-	5,715	1,469	7,184	7,184	-	-	-	-	-	-	-	-	56,068	3,120
Period 4e Period-Dependent Costs																					
4e.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4e.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	526	-	-	-	-	-	131	657	657	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	1	1	-	13	-	4	19	19	-	-	-	294	-	-	-	5,881	2	-
4e.4.5	Plant energy budget	-	-	-	-	-	-	141	21	162	162	-	-	-	-	-	-	-	-	-	-
4e.4.6	NRC Fees	-	-	-	-	-	-	130	13	143	143	-	-	-	-	-	-	-	-	-	-
4e.4.7	Site O&M	-	-	-	-	-	-	350	52	402	402	-	-	-	-	-	-	-	-	-	-
4e.4.8	Environmental	-	-	-	-	-	-	343	51	394	394	-	-	-	-	-	-	-	-	-	-
4e.4.9	Utility Staff Cost	-	-	-	-	-	-	2,165	325	2,490	2,490	-	-	-	-	-	-	-	-	-	33,000
4e.4	*Subtotal Period 4e Period-Dependent Costs*	-	526	1	1	-	13	3,129	598	4,268	4,268	-	-	-	294	-	-	-	5,881	2	33,000
4e.0	TOTAL PERIOD 4e COST	-	526	1	1	-	13	8,997	2,112	11,650	11,650	-	-	-	294	-	-	-	5,881	56,070	36,120
PERIOD 4 TOTALS		5,096	53,555	23,647	17,777	12,201	33,991	28,074	39,997	214,337	213,091	-	1,246	157,744	1,003,422	1,740	115	47	106,401,100	616,993	265,131

Table A
Indian Point Energy Center, Unit 1
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor Containment	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	116	-
5b.1.1.2	Chemical Systems Building	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	375	-
5b.1.1.3	Fuel Handling Building	-	18	-	-	-	-	-	3	21	-	-	21	-	-	-	-	-	-	289	-
5b.1.1.4	Fuel Oil Tank Farm	-	259	-	-	-	-	-	39	297	-	-	297	-	-	-	-	-	-	2,721	-
5b.1.1.5	Gas Bottle Storage	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	209	-
5b.1.1.6	Gas Turbine	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	168	-
5b.1.1.7	Screenwell House	-	98	-	-	-	-	-	15	112	-	-	112	-	-	-	-	-	-	1,127	-
5b.1.1.8	Service Building & H. T. Switchgear	-	252	-	-	-	-	-	38	289	-	-	289	-	-	-	-	-	-	2,865	-
5b.1.1.9	Superheater Building	-	1,030	-	-	-	-	-	154	1,184	-	-	1,184	-	-	-	-	-	-	12,177	-
5b.1.1.10	Transformer Area	-	35	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	435	-
5b.1.1.11	Turbine Building	-	1,267	-	-	-	-	-	190	1,457	-	-	1,457	-	-	-	-	-	-	13,445	-
5b.1.1.12	Turbine Pedestal	-	401	-	-	-	-	-	60	462	-	-	462	-	-	-	-	-	-	3,289	-
5b.1.1	Totals	-	3,429	-	-	-	-	-	514	3,944	-	-	3,944	-	-	-	-	-	-	37,215	-
Site Closeout Activities																					
5b.1.2	BackFill Site	-	3,469	-	-	-	-	-	520	3,990	-	-	3,990	-	-	-	-	-	-	8,904	-
5b.1.3	Grade & landscape site	-	77	-	-	-	-	-	12	89	-	-	89	-	-	-	-	-	-	168	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	111	17	127	127	-	-	-	-	-	-	-	-	-	1,114
5b.1	Subtotal Period 5b Activity Costs	-	6,976	-	-	-	-	111	1,063	8,150	127	-	8,022	-	-	-	-	-	-	46,288	1,114
Period 5b Additional Costs																					
5b.2.1	Concrete Crushing	-	104	-	-	-	-	1	16	120	-	-	120	-	-	-	-	-	-	434	-
5b.2.2	Unit 1 Legacy Soil Remediation	-	2,898	338	16,719	-	33,139	-	11,551	64,645	64,645	-	-	-	1,262,434	-	-	-	96,444,000	25,372	-
5b.2	Subtotal Period 5b Additional Costs	-	3,002	338	16,719	-	33,139	1	11,567	64,765	64,645	-	120	-	1,262,434	-	-	-	96,444,000	25,806	-
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	106	-	-	-	-	-	16	122	-	-	122	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	106	-	-	-	-	-	16	122	-	-	122	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	9,291	-	-	-	-	-	1,394	10,684	-	-	10,684	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	375	56	431	-	-	431	-	-	-	-	-	-	-	-
5b.4.5	Site O&M	-	-	-	-	-	-	1,861	279	2,140	2,140	-	-	-	-	-	-	-	-	-	-
5b.4.6	Environmental	-	-	-	-	-	-	1,824	274	2,098	2,098	-	-	-	-	-	-	-	-	-	-
5b.4.7	Utility Staff Cost	-	-	-	-	-	-	5,349	802	6,151	-	-	6,151	-	-	-	-	-	-	-	79,420
5b.4	Subtotal Period 5b Period-Dependent Costs	-	9,291	-	-	-	-	9,409	2,805	21,504	4,238	-	17,266	-	-	-	-	-	-	-	79,420
5b.0	TOTAL PERIOD 5b COST	-	19,375	338	16,719	-	33,139	9,520	15,450	94,542	69,010	-	25,531	-	1,262,434	-	-	-	96,444,000	72,094	80,534
PERIOD 5 TOTALS		-	19,375	338	16,719	-	33,139	9,520	15,450	94,542	69,010	-	25,531	-	1,262,434	-	-	-	96,444,000	72,094	80,534
TOTAL COST TO DECOMMISSION		6,085	81,216	24,073	34,678	12,201	69,920	287,479	75,278	590,930	547,458	15,929	27,543	157,744	2,296,075	1,740	115	47	203,371,900	710,102	979,487

Table A
Indian Point Energy Center, Unit 1
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			

TOTAL COST TO DECOMMISSION WITH 14.6% CONTINGENCY:	$590,930	thousands of 2007 dollars
TOTAL NRC LICENSE TERMINATION COST IS 92.64% OR:	$547,458	thousands of 2007 dollars
SPENT FUEL MANAGEMENT COST IS 2.7% OR:	$15,929	thousands of 2007 dollars
NON-NUCLEAR DEMOLITION COST IS 4.66% OR:	$27,543	thousands of 2007 dollars
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	2,297,929	cubic feet
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	47	cubic feet
TOTAL SCRAP METAL REMOVED:	26,675	tons
TOTAL CRAFT LABOR REQUIREMENTS:	710,102	man-hours

End Notes:
n/a - indicates that this activity not charged as decommissioning expense.
a - indicates that this activity performed by decommissioning staff.
0 - indicates that this value is less than 0.5 but is non-zero.
a cell containing " - " indicates a zero value

Enclosure 2 to NL-08-144

Preliminary Decommissioning Cost Analysis for the Indian Point Energy Center, Unit 2

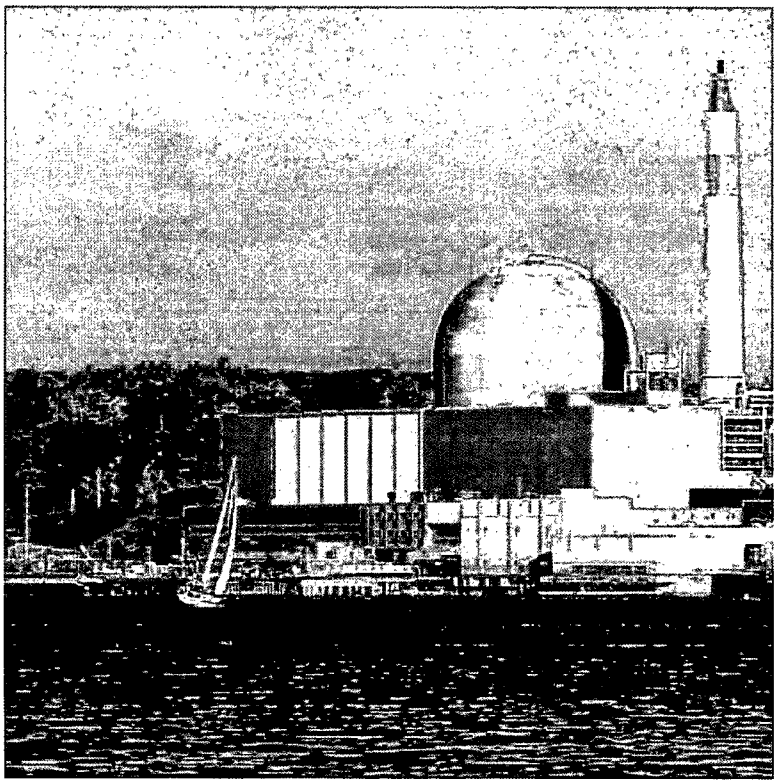
ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GENERATING UNIT 2
DOCKET NO. 50-247

Document E11-1583-003

PRELIMINARY DECOMMISSIONING COST ANALYSIS

for the

INDIAN POINT ENERGY CENTER, UNIT 2



prepared for

Entergy Nuclear

prepared by

TLG Services, Inc.
Bridgewater, Connecticut

October 2008

APPROVALS

Project Manager	William A. Cloutier, Jr.	10/21/2008
	William A. Cloutier, Jr.	**Date**
Project Engineer	Thomas J. Garrett	10/21/08
	Thomas J. Garrett	**Date**
Technical Manager	Geoffrey M. Griffiths	10/21/08
	Geoffrey M. Griffiths	**Date**
Quality Assurance Manager	Joseph J. Adler	10/22/08
	Joseph J. Adler	**Date**

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APPENDIX

REVISION LOG

No.	CRA No.	Date	Item Revised	Reason for Revision
0		10-22-2008		Original Issue

1. DECOMMISSIONING COST ANALYSIS

This document presents the cost to decommission the Indian Point Energy Center, Unit 2 (IP-2) assuming a cessation of operations after a nominal 40-year operating life in 2013. In accordance with the requirements of 10 CFR 50.75(f)(3), the cost estimate includes an assessment of the major factors that could affect the cost to decommission the IP-2 nuclear unit.

The cost to decommission IP-2 is estimated at $920.5 million. The cost is presented in 2007 dollars for consistent year comparison with the Company's latest filing on the status of the IP-2 decommissioning trust fund.[1]

The estimate for IP-2 assumes that it is decommissioned in conjunction with the two adjacent units (the shutdown IP-1 and the currently operating IP-3). As such, there are savings as well as additional costs that are reflected within the estimate from the synergies of site decommissioning and the constraints imposed in working on a complex and congested site. In apportioning site decommissioning costs by unit, not all common costs are shared equitably (e.g., due to the offset in shutdown dates) and some costs elements are impacted by activities or previous operations at adjacent units.

The cost includes the monies anticipated to be spent for operating license termination, spent fuel storage and site remediation activities. The cost is based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site remediation and restoration requirements. Many of these assumptions are discussed in more detail in this document.

Entergy intends to fund the expenditures for license termination (comprising approximately 72% of the total cost) from the currently existing decommissioning trust fund. The management of the spent fuel, until it can be transferred to the DOE, may be funded from excess trust fund earnings and from proceeds from spent fuel litigation against the Department of Energy (DOE). Expenditures from the trust fund for the management of the spent fuel will not reduce the value of the decommissioning trust fund to below the amount necessary to place and maintain the reactor in safe storage to place and maintain the reactor in safe storage. The licensee would make the appropriate submittals for an exemption in accordance with 10 CFR 50.12 from the requirements of 10 CFR 50.82(a)(8)(i)(A) in order to use the decommissioning trust funds for non-decommissioning related expenses, as defined by 10 CFR 50.2.

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1 Entergy Nuclear Operations' submittal of its "Decommissioning Fund Status Report" to the Nuclear Regulatory Commission, Letter No. ENOC-08-00028, dated May 8, 2008

1.1 DECOMMISSIONING ALTERNATIVES

The Nuclear Regulatory Commission (NRC) provided general decommissioning guidance in a rule adopted on June 27, 1988.[2] In this rule, the NRC set forth technical and financial criteria for decommissioning licensed nuclear facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."[3]

SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."[4] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.

ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactive material decays to a level permitting unrestricted release of the property."[5] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years.

1.2 REGULATORY GUIDANCE

In 1996, the NRC published revisions to its general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in

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2 U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72 "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, Federal Register Volume 53, Number 123 (p 24018 et seq.), June 27, 1988

3 Ibid. Page FR24022, Column 3

4 Ibid.

5 Ibid. Page FR24023, Column 2

the decommissioning process.[6] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184, issued in July 2000, further described the methods and procedures that are acceptable to the NRC staff for implementing the requirements of the 1996 revised rule that relate to the initial activities and the major phases of the decommissioning process. The cost estimate for IP-2 follows the general guidance and sequence presented in the amended regulations.

1.3 BASIS OF COST ESTIMATE

For the purpose of the analysis, IP-2 was assumed to cease operations in September 2013, after 40 years of operations. The unit would then be placed in safe-storage (SAFSTOR), with the spent fuel relocated to an Independent Spent Fuel Storage Installation (ISFSI) to await transfer to a DOE facility. Based upon a 2017 start date for the pickup of spent fuel from the commercial nuclear power generators, Entergy anticipates that the removal of spent fuel from the site could be completed by the year 2043. However, for purposes of this analysis, the plant will remain in storage until 2064, at which time it will be decommissioned and the site released for alternative use without restriction. This sequence of events is delineated in Figure 1 along with major milestone dates.

The decommissioning estimate was developed using the site-specific, technical information relied upon in the decommissioning assessments prepared in 2000 and 2002.[7][8] This information was reviewed for the current analysis and updated to reflect any significant changes in the plant configuration over the past five years. The site-specific considerations and assumptions used in the previous evaluation were also revisited. Modifications were incorporated where new information was available or experience from recent decommissioning projects provided viable alternatives or improved processes. On site interviews were conducted between August and November 2007 to assist in obtaining current site specific conditions as well as collect financial data.

1.4 METHODOLOGY

The methodology used to develop the estimate followed the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for

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6 U.S. Code of Federal Regulations, Title 10, Parts 2, 50, and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, Federal Register Volume 61, (p 39278 et seq.), July 29, 1996

7 Decommissioning Cost Evaluation Due Diligence Estimate for the Indian Point 1 & 2 Nuclear Generating Stations Document No. E11-1395-002, September 2000.

8 TLG Document No. E11-1449-002, December 19, 2002

Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"[9] and the DOE "Decommissioning Handbook."[10] These documents present a unit cost factor method for estimating decommissioning activity costs that simplifies the calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) were developed using local labor rates. The activity-dependent costs were then estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, "Building Construction Cost Data," published by R.S. Means.[11]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted.

This analysis reflected lessons learned from TLG's involvement in the Shippingport Station decommissioning, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells, and associated facilities, completed in 1997. In addition, the planning and engineering for the Pathfinder, Shoreham, Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Connecticut Yankee, and San Onofre-1 nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

TLG has historically applied work difficulty adjustment factors (WDFs) to account for the inefficiencies in working in a power plant environment. WDFs are assigned to each unique set of unit factors, commensurate with the working conditions. The ranges used for the WDFs were as follows:

- Access Factor 0% to 30%
- Respiratory Protection Factor 0% to 50%

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9 T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

10 W.J. Manion and T.S. LaGuardia, "Decommissioning Handbook," U.S. Department of Energy, DOE/EV/10128-1, November 1980

11 "Building Construction Cost Data 2007," Robert Snow Means Company, Inc., Kingston, Massachusetts

- Radiation/ALARA Factor 0% to 37%
- Protective Clothing Factor 0% to 50%
- Work Break Factor 8.33%

The factors and their associated range of values were originally developed in conjunction with the AIF/NESP-036 study.

Scheduling Program Durations

Activity durations are used to develop the total decommissioning program schedule. The unit cost factors, adjusted for WDFs as described above, are applied against the inventory of materials to be removed. The work area (or building area) is then evaluated for the most efficient number of workers/crews for the identified decommissioning activities. The adjusted unit cost factors are then compared against the available manpower so that an overall duration for removal of components and piping from each work area can be calculated.

The schedule is used to assign carrying costs, which include program management, administration, field engineering, equipment rental, and support services such as quality control and security.

1.5 IMPACT OF DECOMMISSIONING MULTIPLE REACTOR UNITS

In estimating the near simultaneous decommissioning of three co-located reactor units there can be opportunities to achieve economies of scale, by sharing costs between units, and coordinating the sequence of work activities. There will also be schedule constraints, particularly where there are requirements for specialty equipment and staff, or practical limitations on when final status surveys can take place. The estimate for IP-2 considered:

- Savings in program management, in particular costs associated with the more senior positions, from the sequential decommissioning of two, essentially identical reactors. The estimate assumes that IP-2 is the lead unit in decommissioning through the disposition of the reactor vessel and primary system components, at which time IP-3 assumes the lead. Costs for the senior staff positions are only included for the lead unit.
- The current need by IP-3 to use the IP-2 spent fuel pool to transfer spent fuel to the ISFSI. As such, the estimate for IP-2 includes an extended period of spent fuel pool operations.
- The confines of a congested site and the need to coordinate dismantling operations. Demolition and soil remediation, following the primary

decommissioning phase (removal of major source terms and radiological inventory), are conducted as a site-wide activity.

- Sharing of station costs such as ISFSI operations, security, emergency response fees, regulatory agency fees, corporate overhead, and insurance.

1.6 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal (i.e., license termination and site restoration).

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

1.6.1 Contingency

Consistent with standard cost estimating practices, contingencies were applied to the decontamination and dismantling costs developed as a "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."[12] The cost elements in the estimate were based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, were addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the nuclear unit or during the extended storage period.

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the

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12 Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239.

end of the detailed estimate. The composite contingency value reported for the SAFSTOR scenario, and as shown in the detail table in Appendix A, is 17.26%.

1.6.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these types of costs under the broad term "financial risk." Included within the category of financial risk are:

- Transition activities and costs: ancillary expenses associated with eliminating 50% to 80% of the site labor force shortly after the cessation of plant operations, added cost for worker separation packages throughout the decommissioning program, national or company-mandated retraining, and retention incentives for key personnel.
- Delays in approval of the decommissioning plan due to intervention, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes (e.g., affecting worker health and safety, site release criteria, waste transportation, and disposal).
- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition, or in the timetable for such: the start and rate of acceptance of spent fuel by the DOE).
- Pricing changes for basic inputs, such as labor, energy, materials, and burial.

It has been TLG's experience that the results of a risk analysis, when compared with the base case estimate for decommissioning, indicate that the chances of the base decommissioning estimate's being too high

is a low probability, and the chances that the estimate is too low is a higher probability. This cost study, however, does not add any additional costs to the estimate for financial risk, since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk should be revisited periodically and addressed through updates of the base estimate.

1.7 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below were included within the estimate.

1.7.1 Spent Fuel Disposition

Congress passed the "Nuclear Waste Policy Act"[13] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The NWPA provided that DOE would enter into contracts with utilities in which DOE would promise to take the utilities' spent fuel and high-level radioactive waste and utilities would pay the cost of the disposition services for that material. NWPA, along with the individual contracts with the utilities, specified that the DOE was to begin accepting spent fuel by January 31, 1998.

Since the original legislation, the DOE has announced several delays in the program schedule. By January 1998, the DOE had failed to accept any spent fuel or high level waste, as required by the NWPA and utility contracts. Delays continue and, as a result, generators have initiated legal action against the DOE in an attempt to obtain compensation for DOE's breach of contract.

Operation of DOE's yet-to-be constructed repository is contingent upon the review and approval of the facility's license application by the NRC, the successful resolution of pending litigation, and the development of a national transportation system. The DOE submitted its license application to the NRC on June 3, 2008, seeking authorization to construct the repository at Yucca Mountain, Nevada. Assuming a timely

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13 "Nuclear Waste Policy Act of 1982 and Amendments," U.S. Department of Energy's Office of Civilian Radioactive Management, 1982

review, DOE expects that receipt of fuel could begin as early as 2017,[14] depending upon the level of funding appropriated by Congress.

It is generally necessary that spent fuel be actively cooled and stored for a minimum period at the generating site prior to transfer. The NRC requires that licensees establish a program to manage and provide funding for the management of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb).[15] This funding requirement is fulfilled through inclusion of certain cost elements in the decommissioning estimate, for example, costs associated with the isolation and continued operation of the spent fuel pool and ISFSI.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core. Over the next eight years, the assemblies are packaged into multipurpose canisters for transfer directly to the DOE or for interim storage at the ISFSI. It is assumed that this period provides the necessary cooling for the final core to meet the design requirements for decay heat for either the transport or storage systems (the eight-year period also considers the use of the IP-2 pool by IP-3).

DOE's contracts with utilities generally order the acceptance of spent fuel from utilities based upon the oldest fuel receiving the highest priority. For purposes of this analysis, acceptance of commercial spent fuel by the DOE was expected to begin in 2017. The first assemblies removed from the IPEC site was assumed to be in 2018. With an estimated rate of transfer of 3,000 metric tons of uranium (MTU)/year for the commercial industry, completion of the removal of all fuel from the site was projected to be in the year 2045 assuming shutdown of IP-2 in 2013 and IP-3 in 2015. Entergy Nuclear's analysis assumes, for purposes only of this report, that Entergy Nuclear does not employ DOE spent fuel disposal contract allowances for up to 20% additional fuel designation for shipment to DOE each year.

Entergy Nuclear's position is that the DOE has a contractual obligation to accept IPEC fuel earlier than the projections set out above. No assumption made in the study should be interpreted to be inconsistent with this claim. However, at this time, including the cost of storing spent fuel in this study

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14 "DOE Announces Yucca Mountain License Application Schedule", U.S. Department of Energy's Office of Public Affairs, Press Release July 19, 2006

15 U.S. Code of Federal Regulations, Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," Subpart 54 (bb), "Conditions of Licenses"

is the most reasonable approach because it insures the availability of sufficient decommissioning funds at the end of the station's life if, contrary to its contractual obligation, the DOE has not performed earlier.

ISFSI

This analysis assumes that an ISFSI has been constructed within the protected area (PA) to support continued plant operations. The estimate further assumes that this facility is expanded (to a total capacity of 96 casks) to support decommissioning and accommodate the additional dry storage casks needed to off-load the IP-2 wet storage pool (the facility may need to be further expanded for IP-3 spent fuel storage). Once the IP-2 pool is emptied, the spent fuel storage and handling facilities are available for decommissioning or readied for long-term storage.

Operation and maintenance costs for the ISFSI are included within the estimate and address the costs for staffing the facility, as well as security, insurance, and licensing fees. The estimate includes the costs to purchase, load, and transfer the multi-purpose spent fuel storage canisters (MPCs) directly from the pool to the DOE or to the ISFSI for interim storage. Costs are also provided for the final disposition of the facilities once the transfer is complete.

In the absence of identifiable DOE transport cask requirements, the design and capacity of the ISFSI is based upon a commercial dry cask storage system. It should be noted that Entergy's contract with the DOE requires DOE to provide transport canisters to Entergy, but for present purposes, this estimate includes this cost.

Storage Canister Design

The design and capacity of the ISFSI is based upon the Holtec HI-STORM dry cask storage system. The Holtec multi-purpose canister or MPC has a capacity of 32 fuel assemblies.

Canister Loading and Transfer

The estimate includes the costs to purchase, load, and transfer the MPCs from the pool into a DOE-provided transport cask or to the ISFSI. Costs are also included for the transfer of the fuel at the ISFSI to the DOE.

For fuel transferred directly from the pool to the DOE, the DOE is assumed to provide the canister at no additional cost to the owner. It should be noted that, in this analysis, DOE is assumed to use its own Transport, Aging and Disposal (TAD) canister with a capacity of 21 assemblies for wet pool pickup.

Operations and Maintenance

The estimate includes costs for the operation of the spent fuel pool until it is emptied and the operation of the ISFSI until the spent fuel is transferred to the DOE.

The ISFSI operating duration is based upon the previously stated assumptions on fuel transfer schedule expectations.

ISFSI Design Considerations

A multi-purpose (storage and transport) dry shielded storage canister with a vertical, reinforced concrete storage silo is used as a basis for this cost analysis. Approximately 50% of the silos are assumed to have some level of neutron-induced activation as a result of the long-term storage of the fuel (i.e., to levels exceeding free-release limits). Approximately 10% of the concrete and steel is assumed to be removed from the overpacks for controlled disposal. The cost of the disposition of this material, as well as the demolition of the ISFSI facilities, is reflected within the estimate.

GTCC

The dismantling of the reactor internals generates radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the Federal Government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. However, to date, the Federal Government has not identified a cost for disposing of GTCC or a schedule for acceptance. As such, the estimate to decommission IP-2 includes an allowance for the disposition of GTCC material.

For purposes of this study, GTCC is packaged in the same canisters used for spent fuel. The GTCC material is assumed to be shipped directly to a DOE facility as it is generated (since the fuel has been removed from the site prior to the start of decommissioning and the ISFSI deactivated).

1.7.2 Reactor Vessel and Internal Components

The reactor pressure vessel and reactor internal components are segmented for disposal in shielded transportation casks. Segmentation and packaging of the internals are performed in the refueling canal where a turntable and remote cutter are installed. The vessel is segmented in place using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor well. Transportation cask specifications and Department of Transportation (DOT) regulations dictate segmentation and packaging methodology (i.e., packaging will meet the current physical and radiological limitations and regulations). Cask shipments are made in DOT-approved, currently available truck casks.

As stated previously, the dismantling of reactor internals at the IPEC reactors will generate radioactive waste considered unsuitable for shallow land disposal (i.e., GTCC). For purposes of this study, the GTCC radioactive waste has been packaged and disposed of as high-level waste, at a cost equivalent to that envisioned for the spent fuel.

Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package. However, the location of the Trojan Nuclear Plant on the Columbia River simplified the transportation analysis since.

It is not known whether this option will be available when the IPEC units cease operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. Consequently, the study assumes the reactor vessel will be segmented, as a bounding condition.

1.7.3 Primary System Components

The current scenario defers decommissioning for approximately 50 years. The delay will result in lower working area dose rate (from natural decay of the radionuclides produced from plant operations). As such, decontamination of the reactor coolant system components and associated reactor water cleanup systems is not anticipated to be necessary and no allowance is included for this activity within the estimate.

Reactor coolant piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) drops below the nozzle zone. The piping is boxed and shipped by shielded van. The reactor coolant pumps and motors are lifted out intact, packaged, and transported for processing or disposal.

The following discussion deals with the removal and disposition of the steam generators, but the techniques involved are also applicable to other large radioactively-contaminated components, such as heat exchangers and the pressurizer. The steam generators' size and weight, their location within the reactor building, as well as the disposal facility waste acceptance criteria, and access to transportation will ultimately determine the removal, transportation, and disposal strategy.

A crane is set up for the removal of the generators. It can also be used to move portions of the steam generator cubicle walls and floor slabs from the reactor building to a location where they can be decontaminated and transported to the material handling area. Interferences within the work area, such as grating, piping, and other components are removed to create sufficient lay-down space for processing these large components.

The generators are rigged for removal, disconnected from the surrounding piping and supports, and maneuvered into the open area where they are lowered onto a down-ending cradle. Each generator is rotated into the horizontal position for extraction from the containment and placed onto a multi-wheeled vehicle for transport to an on-site preparation area.

Disposal costs are based upon the displaced volume and weight of the primary side portions of the steam generators. Each component is then

loaded onto a barge for transport to a rail head and the disposal facility. The secondary side is assumed to be sent to an off-site waste processor.

1.7.4 Retired Components

The estimate includes the cost to dispose of the retired steam generators currently stored on site. Transportation and disposal will occur following the removal of the installed steam generators.

1.7.5 Main Turbine and Condenser

The main turbine is dismantled using conventional maintenance procedures. The turbine rotors and shafts are removed to a laydown area. The lower turbine casings are removed from their anchors by controlled demolition. The main condensers are also disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it will be surveyed and designated for either decontamination or volume reduction, conventional disposal, or controlled disposal. Components are packaged and readied for transport in accordance with the intended disposition.

1.7.6 Transportation Methods

It is expected that most of the contaminated piping, components, and structural material, other than the highly activated reactor vessel and internal components, will qualify as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as described in Title 49.[16] The contaminated material is packaged in Industrial Packages (IP-1, IP-2, or IP-3, as defined in subpart 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with §71, as Type B. It is conceivable that the reactor may qualify as LSA II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has not reached levels exceeding those that permit the major reactor

16 U.S. Department of Transportation, Section 49 of the Code of Federal Regulations, "Transportation," Parts 173 through 178, 2007

components to be shipped under current transport regulations requirements.

Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, is by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible is based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

Considering the location of IPEC (see map above) and the potential for restricted road use, it is assumed that transportation of materials requiring controlled disposal will utilize the Hudson River via barge shipment to the nearest transfer point for rail or trucking to the Energy-Solutions' facility in Clive, Utah. However, for estimating purposes, costs to transport the majority of the low-level radioactive waste (excluding large components) were based upon truck transport costs developed from published tariffs from Tri-State Motor Transit.[17] Memphis (TN) was used as the destination for off-site processing.

1.7.7 Low-Level Radioactive Waste Conditioning and Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980,[18] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders.

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17 Tri-State Motor Transit Company, published tariffs, Interstate Commerce Commission (ICC), Docket No. MC-427719 Rules Tariff, March 2004, Radioactive Materials Tariff, February 2006.

18 "Low Level Radioactive Waste Policy Act of 1980," Public Law 96-573, 1980

The federal law encouraged the formation of regional groups or compacts to implement this objective safely, efficiently, and economically, and set a target date of 1986 for implementation. After little progress, the "Low-Level Radioactive Waste Policy Amendments Act of 1985,[19] extended the implementation schedule, with specific milestones and stiff sanctions for non-compliance. Subsequent court rulings have substantially diluted those sanctions and, to date, no new compact facilities have been successfully sited, licensed and constructed.

At the time this analysis was prepared, IP-2 was able to dispose of Class A, B or C low-level radioactive waste[20] at the licensed commercial low-level radioactive waste disposal facility in Barnwell, South Carolina. In June 2000, South Carolina formally joined with Connecticut and New Jersey to form the Atlantic Compact. South Carolina legislation requires South Carolina to gradually limit disposal capacity at the Barnwell facility through mid-2008. As of June 30, 2008, access to the Barnwell Low-Level Radioactive Waste Disposal Facility is available only to generators located in states affiliated with the Atlantic Compact. However, IP-2 is still able to dispose of Class A material at EnergySolutions' facility in Clive, Utah.

The costs reported for direct disposal (burial) in the estimate are based upon Entergy Nuclear Operations, Inc. current Life of Plant Disposal Agreement with EnergySolutions.[21] This facility was used as the destination for the majority of the waste volume generated by decommissioning (99.3%). EnergySolutions does not have a license to dispose of the more highly radioactive waste (Class B and C) generated in the dismantling of the reactor. As such, the disposal costs for this material (representing approximately 0.6% of the waste volume) were based upon Barnwell disposal rates, as a proxy.

Material exceeding Class C limits (limited to material closest to the reactor core and comprising approximately 0.1% of the total waste volume) is generally not suitable for shallow-land disposal. This material is packaged in the same multipurpose canisters used for spent fuel storage/transport and designated for geologic disposal.

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19 "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, January 15, 1986

20 U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

21 General Services Agreement 10160239 between Entergy Nuclear Operations and EnergySolutions, June 2007

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/ recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to eliminate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimate reflects the savings from waste recovery/volume reduction. Costs for waste processing/reduction were also based upon existing agreements.

Disposition of the low-level radioactive waste generated from decommissioning operations (and cost basis) is summarized in Table 1.

1.7.8 Site Conditions Following Decommissioning

The NRC will terminate (or amend) the site license when it determines that site remediation has been performed in accordance with the license termination plan, and that the final status survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process ends at this point. Building codes and state environmental regulations dictate the next step in the decommissioning process, as well as the owner's own future plans and commitments for the site.[22]

Only existing site structures are considered in the dismantling cost. The current analysis includes all structures as defined in the site plot plan.[23] The electrical switchyard remains after Indian Point is decommissioned in support of the regional transmission and distribution system. The Generation Support Building and IPEC Training Center remain in place for future use. Clean non-contaminated structures are removed to a nominal depth of three feet below grade. The voids are backfilled with clean debris and capped with soil. The site is then re-graded to conform to the adjacent landscape. Vegetation is established to inhibit erosion. These "non-radiological costs" are included in the total cost of decommissioning.

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22 "Entergy is committed to returning the Indian Point Unit 1, 2 and 3 facilities and the surrounding site to a "Greenfield" condition." Letter from Michael R. Kansler to Westchester County Attorney Alan D. Scheinkman, March 16, 2001

23 Entergy Nuclear Northeast "Buildings and Structures Identification Plan" ER-04-2-012, Rev. 01

Site utility and service piping are abandoned in place. Electrical manholes are backfilled with suitable earthen material. Asphalt surfaces in the immediate vicinity of site buildings are broken up and the material used for fill, as required. The site access road remains in place.

1.7.9 Site Contamination

As indicated by the IPEC Groundwater Investigation Project,[24] it is likely that radionuclides in the soil has contaminated portions of the subsurface power block structures. As such, sub-grade surfaces of the following IP-2 structures are designated for removal:

- Discharge Canal
- Fuel Storage Building, and
- Turbine Building (approximately 50%).

All other structures or buildings expect to be impacted in the decontamination process are removed to a nominal depth of three feet below grade.

Site remediation costs include the removal and disposition of 379,000 cubic feet of potentially contaminated soil on the IP-2 site. This volume includes soil contaminated by IP-1 located within the boundaries of the IP-2 site.

1.8 ASSUMPTIONS

The following assumptions were made in the development of the estimate for decommissioning IP-2.

1.8.1 Estimating Basis

Decommissioning costs are reported in the year of projected expenditure; however, the values are provided in 2007 dollars. Costs are not inflated, escalated, or discounted over the periods of performance.

The estimates rely upon the physical plant inventory that was the basis for the 2002 analysis (updated to reflect any significant changes to the plant over the past five years).

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24 "Hydrogeologic Site Investigation Report," GZA GeoEnvironmental, Inc., January 2008

The study follows the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

1.8.2 Release Criteria

This estimate assumes that the site will be remediated to the levels specified by the NRC and the State of New York. Specifically, "the total effective dose equivalent to the maximally exposed individual of the general public, from radioactive material remaining at a site after cleanup, shall be as low as reasonably achievable and less than 10 mrem above that received from background levels of radiation in any one year."[25]

1.8.3 Labor Costs

Entergy will manage the decontamination and dismantling of the nuclear unit in addition to maintaining site security, radiological health and safety, quality assurance and overall site administration during the decommissioning. Entergy will provide the supervisory staff needed to oversee the labor subcontractors, consultants, and specialty contractors engaged to perform the field work associated with the decontamination and dismantling efforts.

Personnel costs are based upon average salary information made available by Entergy. Overhead costs are included for site and corporate support, reduced commensurate with the staffing levels envisioned for the project.

Severance and retention costs are not included in the estimates. Reduction in the operating organization is assumed to be handled through normal staffing processes (e.g., reassignment and outplacement).

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25 NYSDEC Division of Solid & Hazardous Materials, Bureau of Hazardous Waste Radiation Management: Cleanup Guidelines for Soils Contaminated with Radioactive Materials (DSHM-RAD-05-01)

The craft labor required to decontaminate and dismantle the nuclear unit is acquired through standard site contracting practices. The current cost of site labor is used as an estimating basis.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel. A full-time security force is assigned to the nuclear unit. With one exception, IP-2 is also assumed to provide for any IP-1 security requirements. IP-1 specific security requirements are addressed in the IP-1 estimate.

1.8.4 Design Conditions

Activation levels in the vessel and internal components are modeled using NUREG/CR-3474.[26] Estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the IPEC components, projected operating life, and different period of decay. Additional short-lived isotopes were derived from CR-0130[27] and CR-0672,[28] and benchmarked to the long-lived values from CR-3474.

The control elements are disposed of along with the spent fuel (i.e., there is no additional cost provided for their disposal). Disposition of any control elements stored in the pools from operations is considered an operating expense and therefore not accounted for in the decommissioning estimates.

Activation of the reactor building structures was assumed to be confined to the biological shield.

1.8.5 General

Transition Activities

Existing warehouses are cleared of non-essential material and remain for use by IPEC and its subcontractors. The plant's operating staff

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26 J.C. Evans et al., "Long-Lived Activation Products in Reactor Materials" NUREG/CR-3474, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, August 1984

27 R.I. Smith, G.J. Konzek, W.E. Kennedy, Jr., "Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station," NUREG/CR-0130 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, June 1978

28 H.D. Oak, et al., "Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station," NUREG/CR-0672 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, June 1980

performs the following activities at no additional cost or credit to the project during the transition period.

- Drain and collect fuel oils, lubricating oils, and transformer oils for recycle and/or sale.
- Drain and collect acids, caustics, and other chemical stores for recycle and/or sale.
- Process operating waste inventories. Disposal of operating wastes during this initial period is not considered a decommissioning expense; however, the estimate does include the disposition of the retired steam generators currently in storage.

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Entergy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that buyers prefer equipment stripped down to very specific requirements before they would consider purchase. This can require expensive rework after the equipment had been removed from its installed location. Since placing salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall cost of decommissioning, this analysis does not attempt to quantify the value that an owner may realize based upon those efforts.

It is assumed, for purposes of this analysis, that any value received from the sale of scrap generated in the dismantling process would be more than offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional cost for size reduction and preparation to meet "furnace ready" conditions. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property is removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts are made available for alternative use.

Spent Fuel Pool Isolation

The decommissioning cost estimate for IP-2 assumes that the spent fuel building will be used for the interim storage of spent fuel once plant operations cease until the fuel can be either transferred directly to the DOE or relocated to the ISFSI. Therefore, so that the adjacent power block structures can be de-energized and configured for long-term storage, the spent fuel handling building, and in particular the spent fuel storage area, will be isolated, creating a spent fuel island. This process can involve; establishing a local control area, installing in-situ pool cooling and water cleanup systems, establishing and routing independent power and control systems, redesigning the heating and ventilation systems, reconfiguring the area monitoring systems and relocating the security boundary. Costs for these activities are based upon experience at plants that have undergone decommissioning and, in the process, isolated their spent fuel pool operations.

Energy

For estimating purposes, the plant is assumed to be de-energized, with the exception of those facilities associated with spent fuel storage (temporary power is run throughout the plant, as needed). Replacement power costs are used to calculate the cost of energy consumed during decommissioning for tooling, lighting, ventilation, and essential services.

Insurance

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are included and based upon current operating premiums. Reductions in premiums, throughout the decommissioning process, are consistent with the guidance and the limits for coverage defined in the NRC's proposed rulemaking "Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors."[29] The NRC's financial protection requirements are based on various reactor (and spent fuel) configurations.

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[29] "Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors," 10 CFR Parts 50 and 140, Federal Register Notice, Vol. 62, No. 210, October 30, 1997

Property Tax

Property taxes or fees in lieu of taxes are not included within the estimate.

Emergency Planning Fees

Emergency planning costs are estimated from FEMA, state, and local fees, as provided in the IPEC budget accounts. Maintenance and service costs are included with the annual fees.

Site Modifications

The perimeter fence and in-plant security barriers are moved, as appropriate, to conform to the site security plan in force during the various stages of the project.

2. RESULTS

The proposed decommissioning scenario, major cost contributors and schedule of annual expenditures are summarized in Figure 1 and in Tables 2 and 3. The summaries are based upon the 2007 detailed cost estimate provided in Appendix A. The cost elements are assigned to one of three subcategories: NRC License Termination, Spent Fuel Management, and Site Restoration. The subcategory "NRC License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). The cost reported for this subcategory is generally sufficient to terminate the unit's operating license, recognizing that there may be some additional cost impact from spent fuel management. The costs for license termination are shown in Table 4.

The "Spent Fuel Management" subcategory contains costs associated with post-shutdown spent fuel pool operations, the containerization and transfer of spent fuel to the DOE or ISFSI, and the management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., geologic repository) is complete. It does not include any spent fuel management expenses incurred prior to the cessation of plant operations. The costs for spent fuel management are shown in Table 5.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Non-contaminated structures are removed to a depth of three feet and backfilled to conform to the local grade. Contaminated foundations are removed to bedrock. The costs for site restoration are shown in Table 5.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of costs is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., Asset Retirement Obligation determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, an owner may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

For purposes of this study, GTCC is packaged in the same canisters used for spent fuel. The GTCC material is assumed to be shipped directly to a DOE facility as it is generated (since the fuel has been removed from the site prior to the start of decommissioning and the ISFSI deactivated). While designated for disposal at the geologic repository along with the spent fuel, GTCC waste is still classified herein as low-level radioactive waste and, as such, included as a "License Termination" expense.

2.1 Decommissioning Trust Fund

The decommissioning trust fund, as reported in Entergy's latest status report (dated May 8, 2008) was $347.20 million, as of December 31, 2007.[30] This includes the money available from the Provisional Trust.

2.2 Financial Assurance

It is the current plan, based on the growth of the funds in the IP-2 decommissioning trust, to fund the expenditures for license termination from the currently existing decommissioning trust fund.

Table 4 identifies the cost projected for license termination (in accordance with 10 CFR 50.75). Table 7 provides the details of the proposed funding plan for decommissioning IP-2 based on a 2% real rate of return on the decommissioning trust fund. As shown in Table 7, the current trust fund (as of December 31, 2007) is sufficient to accomplish the intended tasks and terminate the operating license for IP-2. The analysis also shows a surplus in the fund at the completion of decommissioning. This surplus could be made available to fund other activities at the site (e.g., spent fuel management and/or restoration activities), recognizing that the licensee would need to make the appropriate submittals for an exemption in accordance with 10 CFR 50.12 from the requirements of 10 CFR 50.82(a)(8)(i)(A) in order to use the decommissioning trust funds for non-decommissioning related expenses, as defined by 10 CFR 50.2.

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30 Entergy Nuclear Operations' submittal of its "Decommissioning Fund Status Report" to the Nuclear Regulatory Commission, Letter No. ENOC-08-00028, dated May 8, 2008

FIGURE 1
SAFSTOR DECOMMISSIONING TIMELINE
(not to scale)

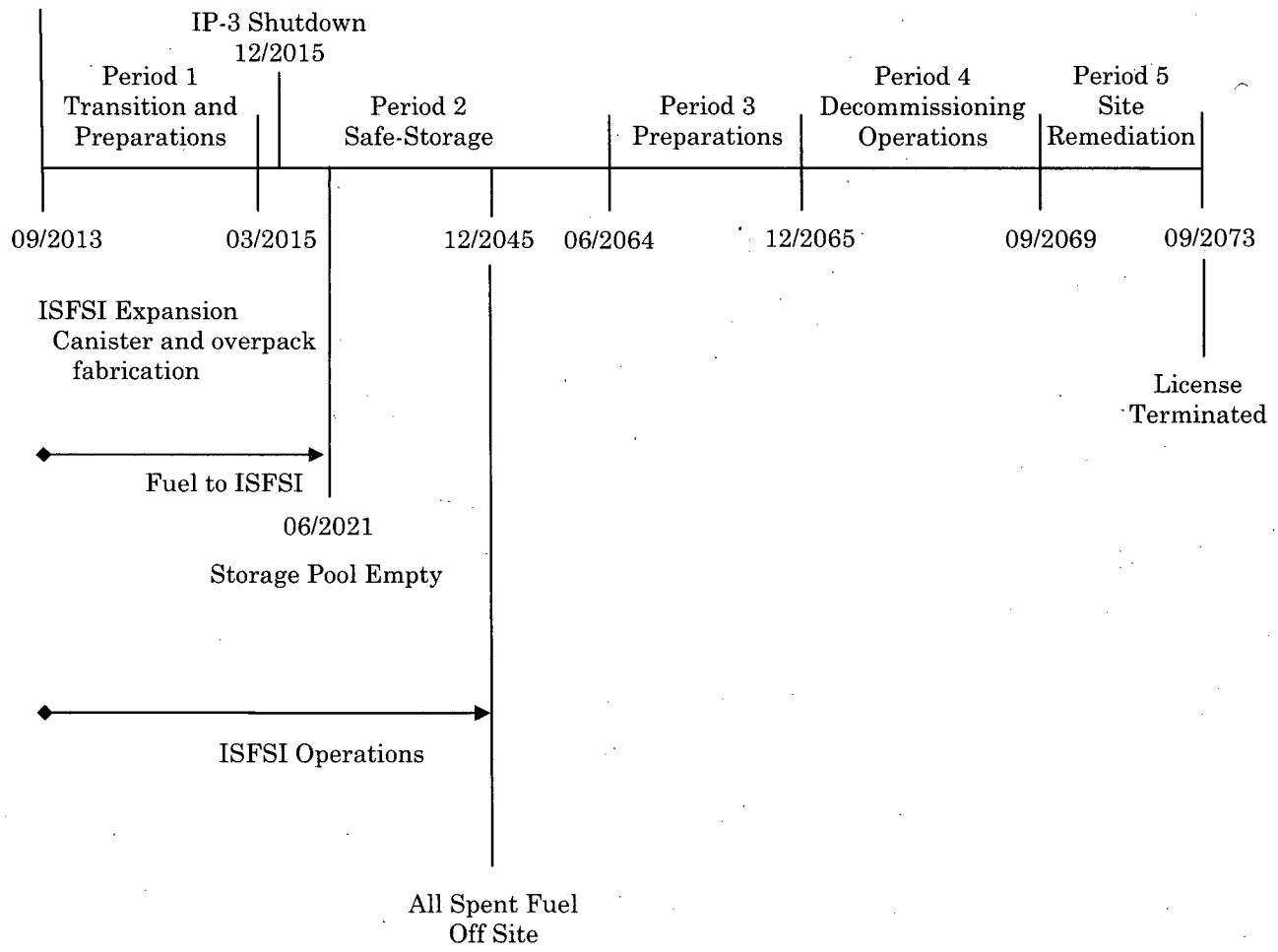

TABLE 1
Indian Point Energy Center, Unit 2
Low-Level Radioactive Waste Disposition

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	620,166	53,686,179
	Barnwell	B	3,330	352,433
	Barnwell	C	501	45,688
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	496	104,146
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	381,062	15,069,040
Total [2]			1,005,554	69,257,486

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding.

TABLE 2
Indian Point Energy Center, Unit 2
Summary of Major Cost Contributors
(thousands, 2007 dollars)

	License Termination	Spent Fuel Management	Site Restoration	Total
Decontamination	13,539	-	-	13,539
Removal	86,741	2,058	45,099	133,898
Waste Packaging	13,502	3	-	13,505
Transportation	21,005	119	-	21,124
Waste Disposal	63,760	107	-	63,867
Waste Processing (Off-site)	32,441	-	-	32,441
Program Management [1]	246,534	73,658	36,506	356,698
Corporate A&G	33,688	-	-	33,688
Site O&M	22,246	3,709	-	25,955
Spent Fuel Management [2]	-	95,895	-	95,895
Spent Fuel Pool Isolation	10,503	-	-	10,503
Insurance and Regulatory Fees	47,813	742	-	48,555
Energy	31,888	1,966	1,260	35,114
Radiological Characterization	17,072	-	-	17,072
Property Taxes	-	-	-	-
Miscellaneous Equipment	15,098	-	4	15,102
Environmental	3,521	-	-	3,521
Total	659,351	178,256	82,869	920,477

[1] Includes security and engineering
[2] Includes capital costs for ISFSI expansion, multi-purpose dry storage containers and storage overpacks, packaging and handling (transfer pool to ISFSI or DOE and ISFSI to DOE)

TABLE 3
Indian Point Energy Center, Unit 2
Schedule of Annual Expenditures
Total Decommissioning Cost
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2013	7,993	452	818	75	2,340	11,678
2014	33,286	4,337	3,143	644	9,834	51,245
2015	15,243	6,087	1,242	450	15,563	38,585
2016	9,844	6,624	630	23	3,560	20,682
2017	9,817	6,606	629	23	3,550	20,625
2018	9,817	6,606	629	23	3,550	20,625
2019	9,817	6,606	629	23	3,550	20,625
2020	9,844	6,624	630	23	3,560	20,682
2021	6,577	3,504	469	23	2,835	13,408
2022	3,426	487	314	22	2,138	6,387
2023	3,426	487	314	22	2,138	6,387
2024	3,435	488	315	22	2,144	6,404
2025	3,426	487	314	22	2,138	6,387
2026	3,426	487	314	22	2,138	6,387
2027	3,426	487	314	22	2,138	6,387
2028	3,435	488	315	22	2,144	6,404
2029	3,426	487	314	22	2,138	6,387
2030	3,426	487	314	22	2,138	6,387
2031	3,426	487	314	22	2,138	6,387
2032	3,435	488	315	22	2,144	6,404
2033	3,426	487	314	22	2,138	6,387
2034	3,426	487	314	22	2,138	6,387
2035	3,426	487	314	22	2,138	6,387
2036	3,435	488	315	22	2,144	6,404
2037	3,426	487	314	22	2,138	6,387
2038	3,426	487	314	22	2,138	6,387
2039	3,426	487	314	22	2,138	6,387
2040	3,435	488	315	22	2,144	6,404
2041	3,426	487	314	22	2,138	6,387
2042	3,426	487	314	22	2,138	6,387
2043	3,426	487	314	22	2,138	6,387
2044	3,435	488	315	22	2,144	6,404

TABLE 3 (continued)
Indian Point Energy Center, Unit 2
Schedule of Annual Expenditures
Total Decommissioning Cost
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2045	3,352	477	314	22	2,095	6,260
2046	1,849	278	314	21	1,205	3,668
2047	1,849	278	314	21	1,205	3,668
2048	1,854	279	315	21	1,209	3,678
2049	1,849	278	314	21	1,205	3,668
2050	1,849	278	314	21	1,205	3,668
2051	1,849	278	314	21	1,205	3,668
2052	1,854	279	315	21	1,209	3,678
2053	1,849	278	314	21	1,205	3,668
2054	1,849	278	314	21	1,205	3,668
2055	1,849	278	314	21	1,205	3,668
2056	1,854	279	315	21	1,209	3,678
2057	1,849	278	314	21	1,205	3,668
2058	1,849	278	314	21	1,205	3,668
2059	1,849	278	314	21	1,205	3,668
2060	1,854	279	315	21	1,209	3,678
2061	1,849	278	314	21	1,205	3,668
2062	1,849	278	314	21	1,205	3,668
2063	1,849	278	314	21	1,205	3,668
2064	18,046	1,528	1,904	26	3,390	24,894
2065	33,595	5,569	3,135	2,703	11,377	56,378
2066	59,374	30,267	2,986	48,793	29,516	170,936
2067	36,100	8,503	2,366	16,144	12,189	75,302
2068	12,254	2,813	965	5,036	5,579	26,647
2069	13,376	6,018	314	2,089	3,732	25,529
2070	13,376	6,018	314	2,089	3,732	25,529
2071	13,376	6,018	314	2,089	3,732	25,529
2072	13,368	5,960	320	2,061	4,059	25,767
2073	7,802	1,039	463	18	17,162	26,485
Total	448,403	137,873	35,114	83,259	215,828	920,477

TABLE 4
Indian Point Energy Center, Unit 2
Schedule of Annual Expenditures
License Termination Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2013	7,993	452	818	75	1,826	11,164
2014	33,286	4,337	3,143	644	7,860	49,271
2015	9,218	1,326	1,004	450	13,309	25,307
2016	1,854	310	315	23	1,209	3,711
2017	1,849	309	314	23	1,205	3,701
2018	1,849	309	314	23	1,205	3,701
2019	1,849	309	314	23	1,205	3,701
2020	1,854	310	315	23	1,209	3,711
2021	1,849	297	314	23	1,205	3,688
2022	1,849	285	314	22	1,205	3,676
2023	1,849	285	314	22	1,205	3,676
2024	1,854	286	315	22	1,209	3,686
2025	1,849	285	314	22	1,205	3,676
2026	1,849	285	314	22	1,205	3,676
2027	1,849	285	314	22	1,205	3,676
2028	1,854	286	315	22	1,209	3,686
2029	1,849	285	314	22	1,205	3,676
2030	1,849	285	314	22	1,205	3,676
2031	1,849	285	314	22	1,205	3,676
2032	1,854	286	315	22	1,209	3,686
2033	1,849	285	314	22	1,205	3,676
2034	1,849	285	314	22	1,205	3,676
2035	1,849	285	314	22	1,205	3,676
2036	1,854	286	315	22	1,209	3,686
2037	1,849	285	314	22	1,205	3,676
2038	1,849	285	314	22	1,205	3,676
2039	1,849	285	314	22	1,205	3,676
2040	1,854	286	315	22	1,209	3,686
2041	1,849	285	314	22	1,205	3,676
2042	1,849	285	314	22	1,205	3,676
2043	1,849	285	314	22	1,205	3,676
2044	1,854	286	315	22	1,209	3,686

TABLE 4 (continued)
Indian Point Energy Center, Unit 2
Schedule of Annual Expenditures
License Termination Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2045	1,849	285	314	22	1,205	3,675
2046	1,849	278	314	21	1,205	3,668
2047	1,849	278	314	21	1,205	3,668
2048	1,854	279	315	21	1,209	3,678
2049	1,849	278	314	21	1,205	3,668
2050	1,849	278	314	21	1,205	3,668
2051	1,849	278	314	21	1,205	3,668
2052	1,854	279	315	21	1,209	3,678
2053	1,849	278	314	21	1,205	3,668
2054	1,849	278	314	21	1,205	3,668
2055	1,849	278	314	21	1,205	3,668
2056	1,854	279	315	21	1,209	3,678
2057	1,849	278	314	21	1,205	3,668
2058	1,849	278	314	21	1,205	3,668
2059	1,849	278	314	21	1,205	3,668
2060	1,854	279	315	21	1,209	3,678
2061	1,849	278	314	21	1,205	3,668
2062	1,849	278	314	21	1,205	3,668
2063	1,849	278	314	21	1,205	3,668
2064	17,902	1,528	1,904	26	3,390	24,751
2065	32,847	5,564	3,135	2,703	11,377	55,625
2066	57,084	30,181	2,986	48,793	29,516	168,560
2067	33,597	8,285	2,366	16,063	11,523	71,834
2068	11,168	2,613	958	5,010	5,364	25,113
2069	138	95	0	2,089	3,724	6,046
2070	138	95	0	2,089	3,724	6,046
2071	138	95	0	2,089	3,724	6,046
2072	308	116	10	2,061	4,051	6,547
2073	7,802	1,039	463	18	17,162	26,485
Total	300,431	69,436	31,888	83,151	174,445	659,351

TABLE 5
Indian Point Energy Center, Unit 2
Schedule of Annual Expenditures
Spent Fuel Management Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2013	0	0	0	0	514	514
2014	0	0	0	0	1,974	1,974
2015	6,025	4,762	238	0	2,255	13,279
2016	7,989	6,314	315	0	2,352	16,971
2017	7,968	6,297	314	0	2,345	16,924
2018	7,968	6,297	314	0	2,345	16,924
2019	7,968	6,297	314	0	2,345	16,924
2020	7,989	6,314	315	0	2,352	16,971
2021	4,728	3,207	155	0	1,629	9,720
2022	1,577	201	0	0	933	2,711
2023	1,577	201	0	0	933	2,711
2024	1,581	202	0	0	936	2,718
2025	1,577	201	0	0	933	2,711
2026	1,577	201	0	0	933	2,711
2027	1,577	201	0	0	933	2,711
2028	1,581	202	0	0	936	2,718
2029	1,577	201	0	0	933	2,711
2030	1,577	201	0	0	933	2,711
2031	1,577	201	0	0	933	2,711
2032	1,581	202	0	0	936	2,718
2033	1,577	201	0	0	933	2,711
2034	1,577	201	0	0	933	2,711
2035	1,577	201	0	0	933	2,711
2036	1,581	202	0	0	936	2,718
2037	1,577	201	0	0	933	2,711
2038	1,577	201	0	0	933	2,711
2039	1,577	201	0	0	933	2,711
2040	1,581	202	0	0	936	2,718
2041	1,577	201	0	0	933	2,711
2042	1,577	201	0	0	933	2,711
2043	1,577	201	0	0	933	2,711
2044	1,581	202	0	0	936	2,718

TABLE 5 (continued)
Indian Point Energy Center, Unit 2
Schedule of Annual Expenditures
Spent Fuel Management Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2045	1,503	192	0	0	889	2,585
2046	0	0	0	0	0	0
2047	0	0	0	0	0	0
2048	0	0	0	0	0	0
2049	0	0	0	0	0	0
2050	0	0	0	0	0	0
2051	0	0	0	0	0	0
2052	0	0	0	0	0	0
2053	0	0	0	0	0	0
2054	0	0	0	0	0	0
2055	0	0	0	0	0	0
2056	0	0	0	0	0	0
2057	0	0	0	0	0	0
2058	0	0	0	0	0	0
2059	0	0	0	0	0	0
2060	0	0	0	0	0	0
2061	0	0	0	0	0	0
2062	0	0	0	0	0	0
2063	0	0	0	0	0	0
2064	0	0	0	0	0	0
2065	0	0	0	0	0	0
2066	0	0	0	0	0	0
2067	423	191	0	81	666	1,361
2068	137	68	0	26	215	446
2069	32	280	0	0	6	318
2070	32	280	0	0	6	318
2071	32	280	0	0	6	318
2072	31	276	0	0	6	314
Total	89,115	45,689	1,966	107	41,379	178,256

TABLE 6
Indian Point Energy Center, Unit 2
Schedule of Annual Expenditures
Site Restoration Allocation
(thousands, 2007 dollars)

Year	Labor	Equip & Materials	Energy	Burial	Other	Yearly Totals
2013-2063	0	0	0	0	0	0
2064	143	0	0	0	0	143
2065	748	5	0	0	0	753
2066	2,290	86	0	0	0	2,376
2067	2,080	27	0	0	0	2,107
2068	950	132	7	0	0	1,088
2069	13,206	5,643	314	0	1	19,165
2070	13,206	5,643	314	0	1	19,165
2071	13,206	5,643	314	0	1	19,165
2072	13,028	5,568	310	0	1	18,907
Total	58,857	22,748	1,260	0	4	82,869

TABLE 7
Funding Requirements for License Termination
2013 Shutdown, 60-Year SAFSTOR

Basis Year		2007	
Fund Balance		$347.20	(millions)
Annual Escalation		0.00%	
Annual Earnings		2.00%	
	A	B	C
Year	License Termination Cost (millions)	Escalated License Termination Cost Escalated at 0% (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2007	-	-	347.200
2008	-	-	354.144
2009	-	-	361.227
2010	-	-	368.451
2011	-	-	375.820
2012	-	-	383.337
2013	11.164	11.164	379.840
2014	49.271	49.271	338.165
2015	25.307	25.307	319.622
2016	3.711	3.711	322.303
2017	3.701	3.701	325.048
2018	3.701	3.701	327.848
2019	3.701	3.701	330.704
2020	3.711	3.711	333.607
2021	3.688	3.688	336.591
2022	3.676	3.676	339.647
2023	3.676	3.676	342.764
2024	3.686	3.686	345.933
2025	3.676	3.676	349.176
2026	3.676	3.676	352.484
2027	3.676	3.676	355.857
2028	3.686	3.686	359.288
2029	3.676	3.676	362.798
2030	3.676	3.676	366.378
2031	3.676	3.676	370.030
2032	3.686	3.686	373.744
2033	3.676	3.676	377.543
2034	3.676	3.676	381.418

TABLE 7 (continued)
Funding Requirements for License Termination
2013 Shutdown, 60-Year SAFSTOR

Basis Year		2007	
Fund Balance		$347.20	(millions)
Annual Escalation		0.00%	
Annual Earnings		2.00%	
	A	B	C
Year	License Termination Cost (millions)	Escalated License Termination Cost Escalated at 0% (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2035	3.676	3.676	385.370
2036	3.686	3.686	389.392
2037	3.676	3.676	393.504
2038	3.676	3.676	397.698
2039	3.676	3.676	401.976
2040	3.686	3.686	406.329
2041	3.676	3.676	410.780
2042	3.676	3.676	415.319
2043	3.676	3.676	419.950
2044	3.686	3.686	424.663
2045	3.675	3.675	429.481
2046	3.668	3.668	434.403
2047	3.668	3.668	439.423
2048	3.678	3.678	444.533
2049	3.668	3.668	449.756
2050	3.668	3.668	455.083
2051	3.668	3.668	460.517
2052	3.678	3.678	466.049
2053	3.668	3.668	471.702
2054	3.668	3.668	477.468
2055	3.668	3.668	483.349
2056	3.678	3.678	489.338
2057	3.668	3.668	495.457
2058	3.668	3.668	501.698
2059	3.668	3.668	508.064
2060	3.678	3.678	514.547
2061	3.668	3.668	521.170
2062	3.668	3.668	527.926

TABLE 7 (continued)
Funding Requirements for License Termination
2013 Shutdown, 60-Year SAFSTOR

Basis Year		2007	
Fund Balance		$347.20	(millions)
Annual Escalation		0.00%	
Annual Earnings		2.00%	
	A	B	C
Year	License Termination Cost (millions)	Escalated License Termination Cost Escalated at 0% (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2063	3.668	3.668	534.816
2064	24.751	24.751	520.762
2065	55.625	55.625	475.552
2066	168.560	168.560	316.503
2067	71.834	71.834	250.999
2068	25.113	25.113	230.906
2069	6.046	6.046	229.478
2070	6.046	6.046	228.022
2071	6.046	6.046	226.536
2072	6.547	6.547	224.520
2073	26.485	26.485	202.525
	659.355	659.355	

Calculations:

Column B = (A)*(1+.00)^(current year – 2007) or for 0%, B = A
Column C = (Previous year's fund balance) * (1 + .02) – B (current year's decommissioning expenditures)

APPENDIX A

2007 DETAILED COST ANALYSIS

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	493	148	641	641	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	61	9	70	70	-	-	-	-	-	-	-	-	-	928
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	93	14	107	107	-	-	-	-	-	-	-	-	-	1,428
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	61	9	70	70	-	-	-	-	-	-	-	-	-	928
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	714
1a.1.11	End product description	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	714
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	70	10	80	80	-	-	-	-	-	-	-	-	-	1,071
1a.1.13	Define major work sequence	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	714
1a.1.14	Perform SER and EA	-	-	-	-	-	-	144	22	166	166	-	-	-	-	-	-	-	-	-	2,213
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	233	35	268	268	-	-	-	-	-	-	-	-	-	3,570
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	229	34	263	263	-	-	-	-	-	-	-	-	-	3,513
1a.1.16.2	Plant systems	-	-	-	-	-	-	194	29	223	223	-	-	-	-	-	-	-	-	-	2,975
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	145	22	167	167	-	-	-	-	-	-	-	-	-	2,228
1a.1.16.4	Waste management	-	-	-	-	-	-	93	14	107	107	-	-	-	-	-	-	-	-	-	1,428
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	93	14	107	107	-	-	-	-	-	-	-	-	-	1,428
1a.1.16	Total	-	-	-	-	-	-	755	113	868	868	-	-	-	-	-	-	-	-	-	11,572
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	845
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	56	8	64	64	-	-	-	-	-	-	-	-	-	857
1a.1.17	Total	-	-	-	-	-	-	111	17	128	128	-	-	-	-	-	-	-	-	-	1,702
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	5	1	5	5	-	-	-	-	-	-	-	-	-	71
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	2,164	398	2,562	2,562	-	-	-	-	-	-	-	-	-	25,625
Period 1a Additional Costs																					
1a.2.1	Asbestos Abatement	-	1,144	0	87	-	202	-	350	1,783	1,783	-	-	-	6,880	-	-	-	89,440	11,698	-
1a.2	Subtotal Period 1a Additional Costs	-	1,144	0	87	-	202	-	350	1,783	1,783	-	-	-	6,880	-	-	-	89,440	11,698	-
Period 1a Collateral Costs																					
1a.3.1	Small tool allowance	-	19	-	-	-	-	-	3	22	22	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	19	-	-	-	-	-	3	22	22	-	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,051	105	1,156	1,156	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	553	-	-	-	-	-	138	691	691	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	466	-	-	-	-	-	70	536	536	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	3	2	-	28	-	7	40	40	-	-	-	610	-	-	-	12,190	5	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	2,733	410	3,143	3,143	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	258	26	284	284	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	981	98	1,079	-	1,079	-	-	-	-	-	-	-	-	-

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1a Period-Dependent Costs (continued)																					
1a.4.9	Site O&M	-	-	-	-	-	-	2,848	427	3,275	3,275	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	738	111	849	-	849	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	41	6	47	-	47	-	-	-	-	-	-	-	-	-
1a.4.12	Groundwater Monitoring	-	-	-	-	-	-	51	8	59	59	-	-	-	-	-	-	-	-	-	-
1a.4.13	Corporate A&G	-	-	-	-	-	-	1,862	279	2,141	2,141	-	-	-	-	-	-	-	-	-	-
1a.4.14	Security Staff Cost	-	-	-	-	-	-	1,648	247	1,895	1,895	-	-	-	-	-	-	-	-	-	46,678
1a.4.15	Utility Staff Cost	-	-	-	-	-	-	22,005	3,301	25,306	25,306	-	-	-	-	-	-	-	-	-	423,400
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,018	3	2	-	28	34,217	5,233	40,500	38,526	1,974	-	-	610	-	-	-	12,190	5	470,078
1a.0	TOTAL PERIOD 1a COST	-	2,181	3	88	-	230	36,380	5,984	44,867	42,893	1,974	-	-	7,490	-	-	-	101,630	11,703	495,704
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor Containment	1,594	-	-	-	-	-	-	797	2,391	2,391	-	-	-	-	-	-	-	-	22,977	-
1b.1.1.2	Fuel Storage Building	506	-	-	-	-	-	-	253	759	759	-	-	-	-	-	-	-	-	6,818	-
1b.1.1.3	Maintainance & Outage Building	31	-	-	-	-	-	-	15	46	46	-	-	-	-	-	-	-	-	450	-
1b.1.1.4	Primary Auxiliary Building	219	-	-	-	-	-	-	109	328	328	-	-	-	-	-	-	-	-	3,208	-
1b.1.1.5	Waste Holdup Tank Pit	42	-	-	-	-	-	-	21	63	63	-	-	-	-	-	-	-	-	612	-
1b.1.1	Totals	2,391	-	-	-	-	-	-	1,196	3,587	3,587	-	-	-	-	-	-	-	-	34,066	-
1b.1	Subtotal Period 1b Activity Costs	2,391	-	-	-	-	-	-	1,196	3,587	3,587	-	-	-	-	-	-	-	-	34,066	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	959	-	-	-	-	-	-	144	1,103	1,103	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process liquid waste	165	-	80	440	-	313	-	235	1,232	1,232	-	-	-	1,123	-	-	-	67,402	219	-
1b.3.3	Small tool allowance	-	50	-	-	-	-	-	8	58	58	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,124	50	80	440	-	313	-	386	2,393	2,393	-	-	-	1,123	-	-	-	67,402	219	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	713	-	-	-	-	-	-	178	892	892	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	265	26	291	291	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	284	-	-	-	-	-	71	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	117	-	-	-	-	-	18	135	135	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	2	1	-	21	-	6	30	30	-	-	-	467	-	-	-	9,349	4	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	689	103	792	792	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	65	7	72	72	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	247	25	272	-	272	-	-	-	-	-	-	-	-	-
1b.4.10	Site O&M	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	186	28	214	-	214	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	10	2	12	-	12	-	-	-	-	-	-	-	-	-
1b.4.13	Groundwater Monitoring	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	-
1b.4.14	Corporate A&G	-	-	-	-	-	-	469	70	540	540	-	-	-	-	-	-	-	-	-	-
1b.4.15	Security Staff Cost	-	-	-	-	-	-	415	62	478	478	-	-	-	-	-	-	-	-	-	11,765
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	5,547	832	6,379	6,379	-	-	-	-	-	-	-	-	-	106,720
1b.4	Subtotal Period 1b Period-Dependent Costs	713	401	2	1	-	21	8,624	1,538	11,302	10,804	498	-	-	467	-	-	-	9,349	4	118,486
1b.0	TOTAL PERIOD 1b COST	4,229	451	82	442	-	334	8,624	3,119	17,281	16,784	498	-	-	1,591	-	-	-	76,751	34,288	118,486

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	480	-	-	-	-	-	72	552	552	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	53	-	-	-	-	-	8	61	61	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	10,582	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	27	4	31	31	-	-	-	-	-	-	-	-	-	416
1c.1	Subtotal Period 1c Activity Costs	-	533	-	-	-	-	760	304	1,596	1,596	-	-	-	-	-	-	-	-	14,282	416
Period 1c Additional Costs																					
1c.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	9,133	1,370	10,503	10,503	-	-	-	-	-	-	-	-	-	-
1c.2	Subtotal Period 1c Additional Costs	-	-	-	-	-	-	9,133	1,370	10,503	10,503	-	-	-	-	-	-	-	-	-	-
Period 1c Collateral Costs																					
1c.3.1	Process liquid waste	185	-	89	494	-	351	-	263	1,382	1,382	-	-	-	1,260	-	-	-	75,615	246	-
1c.3.2	Small tool allowance	-	6	-	-	-	-	-	1	7	7	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	185	6	89	494	-	351	-	264	1,389	1,389	-	-	-	1,260	-	-	-	75,615	246	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	265	26	291	291	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	193	-	-	-	-	-	48	241	241	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	117	-	-	-	-	-	18	135	135	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	1	0	-	7	-	2	10	10	-	-	-	154	-	-	-	3,073	1	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	689	103	792	792	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	65	7	72	72	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	247	25	272	-	272	-	-	-	-	-	-	-	-	-
1c.4.9	Site O&M	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	186	28	214	-	214	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	10	2	12	-	12	-	-	-	-	-	-	-	-	-
1c.4.12	Groundwater Monitoring	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	-
1c.4.13	Corporate A&G	-	-	-	-	-	-	469	70	540	540	-	-	-	-	-	-	-	-	-	-
1c.4.14	Security Staff Cost	-	-	-	-	-	-	415	62	478	478	-	-	-	-	-	-	-	-	-	11,765
1c.4.15	Utility Staff Cost	-	-	-	-	-	-	5,547	832	6,379	6,379	-	-	-	-	-	-	-	-	-	106,720
1c.4	Subtotal Period 1c Period-Dependent Costs	-	310	1	0	-	7	8,624	1,332	10,275	9,778	498	-	-	154	-	-	-	3,073	1	118,486
1c.0	TOTAL PERIOD 1c COST	185	849	90	494	-	358	18,518	3,270	23,764	23,267	498	-	-	1,414	-	-	-	78,687	14,529	118,902
PERIOD 1 TOTALS		4,414	3,481	175	1,025	-	921	63,523	12,374	85,913	82,943	2,970	-	-	10,494	-	-	-	257,068	60,520	733,091
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	134	20	154	154	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	786	197	983	983	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	920	217	1,137	1,137	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	45,666	6,850	52,516	-	52,516	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	45,666	6,850	52,516	-	52,516	-	-	-	-	-	-	-	-	-

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	3,783	378	4,161	3,771	390	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	724	-	-	-	-	-	181	905	905	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	12	8	-	117	-	32	168	168	-	-	-	2,581	-	-	-	51,612	20	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	3,419	513	3,932	1,966	1,966	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	1,349	135	1,484	1,484	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	6,133	613	6,746	-	6,746	-	-	-	-	-	-	-	-	-
2a.4.8	Site O&M	-	-	-	-	-	-	2,155	323	2,478	549	1,929	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	4,615	692	5,308	-	5,308	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	257	39	295	-	295	-	-	-	-	-	-	-	-	-
2a.4.11	Groundwater Monitoring	-	-	-	-	-	-	319	48	367	367	-	-	-	-	-	-	-	-	-	-
2a.4.12	Corporate A&G	-	-	-	-	-	-	1,165	175	1,339	1,339	-	-	-	-	-	-	-	-	-	-
2a.4.13	Security Staff Cost	-	-	-	-	-	-	14,276	2,141	16,418	4,897	11,521	-	-	-	-	-	-	-	-	381,587
2a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,611	4,142	31,752	6,566	25,186	-	-	-	-	-	-	-	-	515,306
2a.4	Subtotal Period 2a Period-Dependent Costs	-	724	12	8	-	117	65,082	9,411	75,353	22,012	53,341	-	-	2,581	-	-	-	51,612	20	896,893
2a.0	TOTAL PERIOD 2a COST	-	724	12	8	-	117	111,668	16,478	129,006	23,149	105,857	-	-	2,581	-	-	-	51,612	20	896,893
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	524	79	603	603	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	3,077	769	3,846	3,846	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	3,601	848	4,449	4,449	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5,713	857	6,570	-	6,570	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	5,713	857	6,570	-	6,570	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	13,736	1,374	15,110	14,758	352	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	2,375	-	-	-	-	-	594	2,968	2,968	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	43	29	-	425	-	115	612	612	-	-	-	9,406	-	-	-	188,114	74	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	6,691	1,004	7,694	7,694	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	5,278	528	5,806	5,806	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	17,771	1,777	19,548	-	19,548	-	-	-	-	-	-	-	-	-
2b.4.8	Site O&M	-	-	-	-	-	-	3,415	512	3,928	2,148	1,780	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	1,005	151	1,156	-	1,156	-	-	-	-	-	-	-	-	-
2b.4.10	Groundwater Monitoring	-	-	-	-	-	-	1,248	187	1,435	1,435	-	-	-	-	-	-	-	-	-	-
2b.4.11	Corporate A&G	-	-	-	-	-	-	4,558	684	5,242	5,242	-	-	-	-	-	-	-	-	-	-
2b.4.12	Security Staff Cost	-	-	-	-	-	-	27,478	4,122	31,600	19,163	12,437	-	-	-	-	-	-	-	-	689,194
2b.4.13	Utility Staff Cost	-	-	-	-	-	-	43,660	6,549	50,210	25,696	24,514	-	-	-	-	-	-	-	-	816,823
2b.4	Subtotal Period 2b Period-Dependent Costs	-	2,375	43	29	-	425	124,841	17,596	145,309	85,522	59,787	-	-	9,406	-	-	-	188,114	74	1,506,017
2b.0	TOTAL PERIOD 2b COST	-	2,375	43	29	-	425	134,155	19,300	156,327	89,971	66,356	-	-	9,406	-	-	-	188,114	74	1,506,017
PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Quarterly Inspection									a											
2c.1.2	Semi-annual environmental survey									a											
2c.1.3	Prepare reports									a											

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes: Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
2c.1.4	Bituminous roof replacement	-	-	-	-	-	-	396	59	455	455	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	2,325	581	2,907	2,907	-	-	-	-	-	-	-	-	-	-
2c.1	*Subtotal Period 2c Activity Costs*	-	-	-	-	-	-	2,721	641	3,362	3,362	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	10,139	1,014	11,153	11,153	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,688	-	-	-	-	-	422	2,110	2,110	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	32	21	-	314	-	85	452	452	-	-	-	6,947	-	-	-	138,939	55	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	5,057	758	5,815	5,815	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	3,989	399	4,388	4,388	-	-	-	-	-	-	-	-	-	-
2c.4.7	Site O&M	-	-	-	-	-	-	1,412	212	1,623	1,623	-	-	-	-	-	-	-	-	-	-
2c.4.8	Groundwater Monitoring	-	-	-	-	-	-	943	142	1,085	1,085	-	-	-	-	-	-	-	-	-	-
2c.4.9	Corporate A&G	-	-	-	-	-	-	3,445	517	3,961	3,961	-	-	-	-	-	-	-	-	-	-
2c.4.10	Security Staff Cost	-	-	-	-	-	-	12,594	1,889	14,483	14,483	-	-	-	-	-	-	-	-	-	289,371
2c.4.11	Utility Staff Cost	-	-	-	-	-	-	16,887	2,533	19,420	19,420	-	-	-	-	-	-	-	-	-	337,600
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,688	32	21	-	314	54,465	7,970	64,491	64,491	-	-	-	6,947	-	-	-	138,939	55	626,971
2c.0	TOTAL PERIOD 2c COST	-	1,688	32	21	-	314	57,187	8,611	67,853	67,853	-	-	-	6,947	-	-	-	138,939	55	626,971
PERIOD 2 TOTALS		-	4,786	87	59	-	856	303,009	44,389	353,186	180,972	172,213	-	-	18,933	-	-	-	378,665	150	3,029,881
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	61	9	70	70	-	-	-	-	-	-	-	-	-	928
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	214	32	246	246	-	-	-	-	-	-	-	-	-	3,284
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	714
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	61	9	70	70	-	-	-	-	-	-	-	-	-	928
3a.1.6	Define major work sequence	-	-	-	-	-	-	349	52	402	402	-	-	-	-	-	-	-	-	-	5,355
3a.1.7	Perform SER and EA	-	-	-	-	-	-	144	22	166	166	-	-	-	-	-	-	-	-	-	2,213
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	233	35	268	268	-	-	-	-	-	-	-	-	-	3,570
3a.1.9	Prepare/submit License Termination Plan	-	-	-	-	-	-	191	29	219	219	-	-	-	-	-	-	-	-	-	2,925
3a.1.10	Receive NRC approval of termination plan									a											
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	343	51	395	355	-	39	-	-	-	-	-	-	-	5,262
3a.1.11.2	Plant systems	-	-	-	-	-	-	194	29	223	201	-	22	-	-	-	-	-	-	-	2,975
3a.1.11.3	Reactor internals	-	-	-	-	-	-	331	50	380	380	-	-	-	-	-	-	-	-	-	5,069
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	303	45	348	348	-	-	-	-	-	-	-	-	-	4,641
3a.1.11.5	Biological shield	-	-	-	-	-	-	23	3	27	27	-	-	-	-	-	-	-	-	-	357
3a.1.11.6	Steam generators	-	-	-	-	-	-	145	22	167	167	-	-	-	-	-	-	-	-	-	2,228
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	74	11	86	43	-	43	-	-	-	-	-	-	-	1,142
3a.1.11.8	Main Turbine	-	-	-	-	-	-	19	3	21	-	-	21	-	-	-	-	-	-	-	286
3a.1.11.9	Main Condensers	-	-	-	-	-	-	19	3	21	-	-	21	-	-	-	-	-	-	-	286
3a.1.11.10	Plant structures & buildings	-	-	-	-	-	-	145	22	167	84	-	84	-	-	-	-	-	-	-	2,228
3a.1.11.11	Waste management	-	-	-	-	-	-	214	32	246	246	-	-	-	-	-	-	-	-	-	3,284
3a.1.11.12	Facility & site closeout	-	-	-	-	-	-	42	6	48	24	-	24	-	-	-	-	-	-	-	643
3a.1.11	Total	-	-	-	-	-	-	1,852	278	2,130	1,875	-	255	-	-	-	-	-	-	-	28,401
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	112	17	129	129	-	-	-	-	-	-	-	-	-	1,714
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	2,419	363	2,782	2,782	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	65	10	75	75	-	-	-	-	-	-	-	-	-	1,000
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,048	307	2,355	2,355	-	-	-	-	-	-	-	-	-	-

Table A
Indian Point Energy Center, Unit 2
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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	57	9	66	66	-	-	-	-	-	-	-	-	-	878
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	7,852	1,178	9,030	8,775	-	255	-	-	-	-	-	-	-	51,910
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	2,218	665	2,883	2,883	-	-	-	-	-	-	-	-	-	-
3a.2	Subtotal Period 3a Additional Costs	-	-	-	-	-	-	2,218	665	2,883	2,883	-	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	548	55	603	603	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	436	-	-	-	-	-	109	545	545	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	466	-	-	-	-	-	70	536	536	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	2	2	-	23	-	6	33	33	-	-	-	514	-	-	-	10,287	4	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	2,733	410	3,143	3,143	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	258	26	284	284	-	-	-	-	-	-	-	-	-	-
3a.4.8	Site O&M	-	-	-	-	-	-	1,740	261	2,001	2,001	-	-	-	-	-	-	-	-	-	-
3a.4.9	Groundwater Monitoring	-	-	-	-	-	-	51	8	59	59	-	-	-	-	-	-	-	-	-	-
3a.4.10	Corporate A&G	-	-	-	-	-	-	1,862	279	2,141	2,141	-	-	-	-	-	-	-	-	-	-
3a.4.11	Security Staff Cost	-	-	-	-	-	-	2,558	384	2,942	2,942	-	-	-	-	-	-	-	-	-	65,179
3a.4.12	Utility Staff Cost	-	-	-	-	-	-	14,994	2,249	17,243	17,243	-	-	-	-	-	-	-	-	-	258,629
3a.4	Subtotal Period 3a Period-Dependent Costs	-	901	2	2	-	23	24,745	3,856	29,530	29,530	-	-	-	514	-	-	-	10,287	4	323,807
3a.0	TOTAL PERIOD 3a COST	-	901	2	2	-	23	34,815	5,700	41,443	41,188	-	255	-	514	-	-	-	10,287	4	375,717
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	336	50	387	348	-	39	-	-	-	-	-	-	-	3,379
3b.1.1.2	Reactor internals	-	-	-	-	-	-	178	27	204	204	-	-	-	-	-	-	-	-	-	1,785
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	96	14	110	28	-	83	-	-	-	-	-	-	-	964
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	714
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	714
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	714
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	258	39	297	297	-	-	-	-	-	-	-	-	-	2,592
3b.1.1.8	Facility closeout	-	-	-	-	-	-	85	13	98	49	-	49	-	-	-	-	-	-	-	857
3b.1.1.9	Missile shields	-	-	-	-	-	-	32	5	37	37	-	-	-	-	-	-	-	-	-	321
3b.1.1.10	Biological shield	-	-	-	-	-	-	85	13	98	98	-	-	-	-	-	-	-	-	-	857
3b.1.1.11	Steam generators	-	-	-	-	-	-	327	49	376	376	-	-	-	-	-	-	-	-	-	3,284
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	71	11	82	41	-	41	-	-	-	-	-	-	-	714
3b.1.1.13	Main Turbine	-	-	-	-	-	-	111	17	127	-	-	127	-	-	-	-	-	-	-	1,114
3b.1.1.14	Main Condensers	-	-	-	-	-	-	111	17	127	-	-	127	-	-	-	-	-	-	-	1,114
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	194	29	223	201	-	22	-	-	-	-	-	-	-	1,949
3b.1.1.16	Reactor building	-	-	-	-	-	-	194	29	223	201	-	22	-	-	-	-	-	-	-	1,949
3b.1.1	Total	-	-	-	-	-	-	2,291	344	2,635	2,124	-	511	-	-	-	-	-	-	-	23,022
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	2,291	344	2,635	2,124	-	511	-	-	-	-	-	-	-	23,022
Period 3b Additional Costs																					
3b.2.1	Staff relocations expenses	-	-	-	-	-	-	3,935	590	4,525	4,525	-	-	-	-	-	-	-	-	-	-
3b.2	Subtotal Period 3b Additional Costs	-	-	-	-	-	-	3,935	590	4,525	4,525	-	-	-	-	-	-	-	-	-	-
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	959	-	-	-	-	-	-	144	1,103	1,103	-	-	-	-	-	-	-	-	-	-
3b.3.2	Pipe cutting equipment	-	957	-	-	-	-	-	143	1,100	1,100	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	959	957	-	-	-	-	-	287	2,203	2,203	-	-	-	-	-	-	-	-	-	-

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	30	-	-	-	-	-	-	7	37	37	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	307	31	337	337	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	240	-	-	-	-	-	60	300	300	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	236	-	-	-	-	-	35	271	271	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	1	1	-	13	-	4	19	19	-	-	-	290	-	-	-	5,800	2	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	1,385	208	1,593	1,593	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	131	13	144	144	-	-	-	-	-	-	-	-	-	-
3b.4.9	Site O&M	-	-	-	-	-	-	1,223	183	1,407	1,407	-	-	-	-	-	-	-	-	-	-
3b.4.10	Groundwater Monitoring	-	-	-	-	-	-	26	4	30	30	-	-	-	-	-	-	-	-	-	-
3b.4.11	Corporate A&G	-	-	-	-	-	-	944	142	1,085	1,085	-	-	-	-	-	-	-	-	-	-
3b.4.12	Security Staff Cost	-	-	-	-	-	-	1,297	194	1,491	1,491	-	-	-	-	-	-	-	-	-	33,036
3b.4.13	Utility Staff Cost	-	-	-	-	-	-	11,102	1,665	12,768	12,768	-	-	-	-	-	-	-	-	-	181,829
3b.4	Subtotal Period 3b Period-Dependent Costs	30	476	1	1	-	13	16,415	2,547	19,483	19,483	-	-	-	290	-	-	-	5,800	2	214,864
3b.0	TOTAL PERIOD 3b COST	989	1,433	1	1	-	13	22,640	3,768	28,845	28,334	-	511	-	290	-	-	-	5,800	2	237,886
PERIOD 3 TOTALS		989	2,334	4	2	-	36	57,455	9,468	70,288	69,522	-	766	-	804	-	-	-	16,087	6	613,603
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	74	314	32	31	158	226	-	204	1,040	1,040	-	-	766	766	-	-	-	177,710	5,523	-
4a.1.1.2	Pressurizer Relief Tank	2	8	2	2	9	12	-	8	42	42	-	-	43	43	-	-	-	9,557	153	-
4a.1.1.3	Reactor Coolant Pumps & Motors	28	123	53	214	170	1,135	-	391	2,115	2,115	-	-	336	4,324	-	-	-	1,274,302	3,631	-
4a.1.1.4	Pressurizer	11	76	354	556	-	617	-	297	1,911	1,911	-	-	-	2,349	-	-	-	258,971	1,805	-
4a.1.1.5	Steam Generators	95	4,780	1,955	3,067	2,175	4,279	-	3,294	19,645	19,645	-	-	37,344	16,301	-	-	-	3,111,693	20,508	2,850
4a.1.1.6	Retired Steam Generator Units	-	-	1,955	3,067	2,175	4,279	-	2,051	13,527	13,527	-	-	37,344	16,301	-	-	-	3,111,693	10,800	2,850
4a.1.1.7	CRDMs/ICIs/Service Structure Removal	40	111	179	53	52	131	-	114	681	681	-	-	753	2,947	-	-	-	81,666	2,120	-
4a.1.1.8	Reactor Vessel Internals	61	2,444	3,674	513	-	3,178	146	4,521	14,536	14,536	-	-	-	2,312	376	501	-	324,059	16,767	803
4a.1.1.9	Vessel & Internals GTCC Disposal	-	-	-	-	-	11,347	-	1,702	13,049	13,049	-	-	-	-	-	-	496	104,146	-	-
4a.1.1.10	Reactor Vessel	-	6,008	902	439	-	6,382	146	8,054	21,931	21,931	-	-	-	6,481	2,955	-	-	954,563	16,767	803
4a.1.1	Totals	312	13,864	9,106	7,943	4,738	31,585	292	20,637	88,476	88,476	-	-	76,586	51,823	3,330	501	496	9,408,359	78,073	7,305
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	500	236	55	692	-	-	261	1,743	1,743	-	-	4,374	-	-	-	-	371,814	7,141	-
4a.1.3	Main Condensers	-	1,914	141	45	560	-	-	583	3,243	3,243	-	-	6,687	-	-	-	-	300,932	27,443	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor Containment	-	1,557	-	-	-	-	-	234	1,791	1,791	-	-	-	-	-	-	-	-	14,977	-
4a.1.4.2	Fuel Storage Building	-	47	-	-	-	-	-	7	54	54	-	-	-	-	-	-	-	-	422	-
4a.1.4.3	Primary Auxiliary Building	-	76	-	-	-	-	-	11	88	88	-	-	-	-	-	-	-	-	758	-
4a.1.4.4	Turbine Building	-	692	-	-	-	-	-	104	796	796	-	-	-	-	-	-	-	-	7,864	-
4a.1.4.5	Waste Holdup Tank Pit	-	14	-	-	-	-	-	2	16	16	-	-	-	-	-	-	-	-	142	-
4a.1.4	Totals	-	2,387	-	-	-	-	-	358	2,745	2,745	-	-	-	-	-	-	-	-	24,163	-
Disposal of Plant Systems																					
4a.1.5.1	Aux Steam & Air Removal	-	377	5	17	216	-	-	130	744	744	-	-	2,856	-	-	-	-	115,977	5,429	-
4a.1.5.2	Aux Steam & Air Removal (RCA)	-	73	1	4	47	-	-	26	151	151	-	-	624	-	-	-	-	25,326	1,040	-
4a.1.5.3	Aux Steam-Primary Plant	-	44	1	2	26	-	-	15	88	88	-	-	347	-	-	-	-	14,081	628	-
4a.1.5.4	Aux Steam-Primary Plant (RCA)	-	65	1	3	33	-	-	22	123	123	-	-	431	-	-	-	-	17,506	909	-
4a.1.5.5	Bearing Cooling Water	-	287	-	-	-	-	-	43	330	-	-	330	-	-	-	-	-	-	4,420	-
4a.1.5.6	Chemical Cleaning	-	607	-	-	-	-	-	91	699	-	-	699	-	-	-	-	-	-	9,466	-
4a.1.5.7	Chemical Feed	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	155	-

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.5.8	Chemical Feed (RCA)	-	52	0	2	22	-	-	17	93	93	-	-	292	-	-	-	-	11,867	671	-
4a.1.5.9	Chemistry Monitoring	-	3	0	0	1	0	-	1	5	5	-	-	7	1	-	-	-	384	45	-
4a.1.5.10	Circulating & Service Water	-	1,548	65	244	3,051	-	-	888	5,796	5,796	-	-	40,386	-	-	-	-	1,640,086	22,748	-
4a.1.5.11	Circulating & Service Water (RCA)	-	66	2	9	111	-	-	35	222	222	-	-	1,464	-	-	-	-	59,459	967	-
4a.1.5.12	Compressed Air	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,791	-
4a.1.5.13	Condensate	-	2,158	62	235	2,934	-	-	1,021	6,410	6,410	-	-	38,847	-	-	-	-	1,577,580	31,510	-
4a.1.5.14	Demineralizer Regeneration	-	51	0	2	22	-	-	16	92	92	-	-	289	-	-	-	-	11,751	706	-
4a.1.5.15	Electro Hydraulic Fluid	-	9	0	0	5	-	-	3	18	18	-	-	71	-	-	-	-	2,899	127	-
4a.1.5.16	Extraction Steam	-	708	21	80	999	-	-	341	2,150	2,150	-	-	13,226	-	-	-	-	537,096	10,471	-
4a.1.5.17	Feedwater	-	1,104	45	91	625	321	-	468	2,654	2,654	-	-	8,272	1,485	-	-	-	467,630	16,058	-
4a.1.5.18	Feedwater Emergency Make-Up	-	76	-	-	-	-	-	11	87	-	-	87	-	-	-	-	-	-	1,129	-
4a.1.5.19	Flash Evaporator	-	250	-	-	-	-	-	37	287	-	-	287	-	-	-	-	-	-	3,863	-
4a.1.5.20	HVAC - Clean	-	974	21	67	751	58	-	383	2,254	2,254	-	-	9,948	265	-	-	-	427,750	13,262	-
4a.1.5.21	Heating Steam & Condensate	-	233	2	9	117	-	-	78	440	440	-	-	1,555	-	-	-	-	63,162	3,337	-
4a.1.5.22	Heating Steam & Condensate (RCA)	-	29	0	1	16	-	-	10	57	57	-	-	209	-	-	-	-	8,489	411	-
4a.1.5.23	Heating Steam & Condensate - FHB	-	105	1	3	39	-	-	32	179	179	-	-	510	-	-	-	-	20,715	1,391	-
4a.1.5.24	Helium & Vacuum Drying	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	57	-
4a.1.5.25	Hypochlorite Feed	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	15	-
4a.1.5.26	IP2 Petroleum Storage Tanks	-	168	-	-	-	-	-	25	193	-	-	193	-	-	-	-	-	-	2,430	-
4a.1.5.27	LP Heater Drains & Vents	-	729	10	37	458	-	-	257	1,491	1,491	-	-	6,067	-	-	-	-	246,398	10,548	-
4a.1.5.28	Low Level Intake Fish Screen Wash	-	15	-	-	-	-	-	2	18	-	-	18	-	-	-	-	-	-	230	-
4a.1.5.29	Low Level Vacuum Priming House	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	47	-
4a.1.5.30	Lube Oil	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	165	-
4a.1.5.31	Lube Oil Lines	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	305	-
4a.1.5.32	Main Gen Hydrogen Gas	-	3	-	-	-	-	-	0	3	-	-	3	-	-	-	-	-	-	38	-
4a.1.5.33	Main Steam	-	1,154	28	105	1,309	-	-	503	3,099	3,099	-	-	17,328	-	-	-	-	703,710	16,938	-
4a.1.5.34	Main Steam (RCA)	-	286	7	26	322	-	-	124	765	765	-	-	4,261	-	-	-	-	173,056	4,205	-
4a.1.5.35	Misc. Drains-Secondary Plant	-	2	0	0	1	-	-	1	4	4	-	-	9	-	-	-	-	352	31	-
4a.1.5.36	Moisture Separator & HP HTR DR & V	-	1,577	58	219	2,739	-	-	844	5,437	5,437	-	-	36,260	-	-	-	-	1,472,533	23,061	-
4a.1.5.37	Polymer Feed	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	16	-
4a.1.5.38	Rad Monitor Circ & Ser Wtr	-	2	0	0	0	-	-	1	3	3	-	-	6	-	-	-	-	249	30	-
4a.1.5.39	Rad Monitor Cont Particulate	-	1	0	0	0	-	-	0	2	2	-	-	3	-	-	-	-	125	15	-
4a.1.5.40	River Water Filtration	-	96	-	-	-	-	-	14	110	-	-	110	-	-	-	-	-	-	1,467	-
4a.1.5.41	Service Water Fuel Oil	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	307	-
4a.1.5.42	St Gen Fd Pmp Lube Oil & Seal Water	-	23	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	344	-
4a.1.5.43	Steam Gen Nitrogen Conn	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	140	-
4a.1.5.44	Steam Generator Blowdown	-	42	0	2	23	-	-	14	82	82	-	-	310	-	-	-	-	12,591	575	-
4a.1.5.45	Steam Generator Blowdown (RCA)	-	2	0	0	1	-	-	1	4	4	-	-	13	-	-	-	-	525	29	-
4a.1.5.46	Steam Generator Blowdown Recirc & Xfer	-	403	3	12	148	-	-	125	691	691	-	-	1,957	-	-	-	-	79,489	5,622	-
4a.1.5.47	Turbine Generator Seal Oil	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	88	-
4a.1.5.48	Turbine Gland Steam	-	45	-	-	-	-	-	7	52	-	-	52	-	-	-	-	-	-	715	-
4a.1.5.49	Vacuum Priming	-	194	-	-	-	-	-	29	223	-	-	223	-	-	-	-	-	-	2,990	-
4a.1.5.50	Waste Holdup Tank Pit	-	314	28	44	291	166	-	173	1,017	1,017	-	-	3,855	994	-	-	-	224,597	4,578	-
4a.1.5.51	Water Tank	-	197	-	-	-	-	-	30	227	-	-	227	-	-	-	-	-	-	2,834	-
4a.1.5	Totals	-	14,273	363	1,214	14,307	546	-	5,853	36,556	34,071	-	2,485	189,404	2,744	-	-	-	7,915,381	208,356	-
4a.1.6	Scaffolding in support of decommissioning	-	511	8	3	32	5	-	135	695	695	-	-	377	23	-	-	-	19,059	8,247	-
4a.1	Subtotal Period 4a Activity Costs	312	33,449	9,854	9,260	20,328	32,135	292	27,827	133,458	130,973	-	2,485	277,429	54,590	3,330	501	496	18,015,550	353,423	7,305
Period 4a Collateral Costs																					
4a.3.1	Process liquid waste	36	-	20	110	-	78	-	56	299	299	-	-	-	280	-	-	-	16,780	55	-
4a.3.2	Small tool allowance	-	472	-	-	-	-	-	71	543	488	-	54	-	-	-	-	-	-	-	-
4a.3.3	Survey and Release of Scrap Metal	-	-	-	-	-	-	111	33	144	144	-	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	36	472	20	110	-	78	111	160	985	931	-	54	-	280	-	-	-	16,780	55	-

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	63	-	-	-	-	-	-	16	78	78	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	646	65	711	711	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	2,148	-	-	-	-	-	537	2,686	2,686	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	2,430	-	-	-	-	-	364	2,794	2,794	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	23	16	-	228	-	62	329	329	-	-	-	5,048	-	-	-	100,961	40	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,775	416	3,191	3,191	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	368	37	404	404	-	-	-	-	-	-	-	-	-	-
4a.4.9	Site O&M	-	-	-	-	-	-	3,073	461	3,534	3,534	-	-	-	-	-	-	-	-	-	-
4a.4.10	Radwaste Processing Equipment/Services	-	-	-	-	-	-	397	60	457	457	-	-	-	-	-	-	-	-	-	-
4a.4.11	Groundwater Monitoring	-	-	-	-	-	-	54	8	63	63	-	-	-	-	-	-	-	-	-	-
4a.4.12	Corporate A&G	-	-	-	-	-	-	1,990	298	2,288	2,288	-	-	-	-	-	-	-	-	-	-
4a.4.13	Security Staff Cost	-	-	-	-	-	-	2,733	410	3,143	3,143	-	-	-	-	-	-	-	-	-	69,643
4a.4.14	Utility Staff Cost	-	-	-	-	-	-	24,803	3,720	28,524	28,524	-	-	-	-	-	-	-	-	-	407,829
4a.4	Subtotal Period 4a Period-Dependent Costs	63	4,578	23	16	-	228	36,839	6,454	48,201	48,201	-	-	-	5,048	-	-	-	100,961	40	477,471
4a.0	TOTAL PERIOD 4a COST	410	38,499	9,897	9,385	20,328	32,441	37,241	34,441	182,644	180,105	-	2,539	277,429	59,918	3,330	501	496	18,133,290	353,517	484,777
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	519	60	158	71	-	562	-	442	1,812	1,812	-	-	-	2,565	-	-	-	230,191	1,001	-
Disposal of Plant Systems																					
4b.1.2.1	Boron Recovery	-	992	36	80	693	192	-	416	2,410	2,410	-	-	9,177	959	-	-	-	451,542	14,292	-
4b.1.2.2	Chemical & Volume Control	-	508	20	31	148	153	-	194	1,055	1,055	-	-	1,961	710	-	-	-	142,481	7,226	-
4b.1.2.3	Component Cooling Water	-	468	35	72	563	212	-	269	1,619	1,619	-	-	7,455	971	-	-	-	389,526	6,872	-
4b.1.2.4	Component Cooling Water (RCA)	-	1,380	64	119	714	489	-	599	3,365	3,365	-	-	9,452	2,236	-	-	-	584,390	19,968	-
4b.1.2.5	Component Cooling Water - FHB	-	109	5	7	39	32	-	43	235	235	-	-	519	147	-	-	-	34,230	1,572	-
4b.1.2.6	Compressed Air (RCA)	-	126	1	3	38	-	-	38	205	205	-	-	501	-	-	-	-	20,360	1,774	-
4b.1.2.7	Containment Hydrogen Analyzer (RCA)	-	14	0	0	5	-	-	4	23	23	-	-	65	-	-	-	-	2,637	180	-
4b.1.2.8	Containment Instrument Air	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	233	-
4b.1.2.9	Containment Instrument Air (RCA)	-	23	0	1	10	-	-	7	42	42	-	-	130	-	-	-	-	5,274	298	-
4b.1.2.10	Containment Spray	-	187	-	-	-	-	-	28	215	-	-	215	-	-	-	-	-	-	2,790	-
4b.1.2.11	Containment Spray (RCA)	-	170	2	9	107	-	-	60	348	348	-	-	1,412	-	-	-	-	57,345	2,357	-
4b.1.2.12	Containment Vacuum & Leakage Monitor	-	62	1	3	33	-	-	21	118	118	-	-	431	-	-	-	-	17,512	850	-
4b.1.2.13	Decontamination	-	29	0	1	19	-	-	10	60	60	-	-	246	-	-	-	-	10,000	384	-
4b.1.2.14	Electrical - Clean Non RCA	-	1,749	-	-	-	-	-	262	2,011	-	-	2,011	-	-	-	-	-	-	25,964	-
4b.1.2.15	Electrical - Clean RCA	-	2,991	46	165	2,058	-	-	1,086	6,345	6,345	-	-	27,243	-	-	-	-	1,106,350	42,545	-
4b.1.2.16	Electrical - Contaminated	-	432	6	20	218	17	-	149	842	842	-	-	2,891	77	-	-	-	124,323	6,225	-
4b.1.2.17	Electrical - FHB	-	29	0	1	11	1	-	9	52	52	-	-	149	4	-	-	-	6,410	420	-
4b.1.2.18	Fire Protection & Domestic Water	-	174	-	-	-	-	-	26	201	-	-	201	-	-	-	-	-	-	2,619	-
4b.1.2.19	Fire Protection & Domestic Water (RCA)	-	32	1	3	33	-	-	13	81	81	-	-	431	-	-	-	-	17,501	448	-
4b.1.2.20	Fuel Pit (RCA)	-	189	14	31	247	89	-	113	683	683	-	-	3,273	408	-	-	-	169,518	2,720	-
4b.1.2.21	Fuel Pit - FHB	-	27	2	2	3	10	-	10	54	54	-	-	38	47	-	-	-	5,790	363	-
4b.1.2.22	Gaseous Waste Disposal	-	53	2	5	40	14	-	24	138	138	-	-	525	67	-	-	-	27,151	778	-
4b.1.2.23	Gaseous Waste Disposal (RCA)	-	60	2	4	20	18	-	23	128	128	-	-	265	82	-	-	-	18,116	870	-
4b.1.2.24	Gaseous Waste Disposal - FHB	-	2	0	0	1	0	-	1	4	4	-	-	18	1	-	-	-	812	25	-
4b.1.2.25	HVAC - RCA (FHB)	-	8	0	1	7	-	-	3	19	19	-	-	87	-	-	-	-	3,526	110	-
4b.1.2.26	HVAC - RCA (Other)	-	260	6	20	256	-	-	107	649	649	-	-	3,386	-	-	-	-	137,500	3,176	-
4b.1.2.27	Hydraulic Fluid -Personnel Hatch	-	1	0	0	0	-	-	0	1	1	-	-	3	-	-	-	-	125	11	-
4b.1.2.28	Oxygen (RCA)	-	2	0	0	1	-	-	1	5	5	-	-	19	-	-	-	-	767	36	-
4b.1.2.29	Radiation Monitoring	-	8	0	0	2	-	-	2	13	13	-	-	28	-	-	-	-	1,152	116	-
4b.1.2.30	Radiation Monitoring (RCA)	-	5	0	0	2	-	-	2	9	9	-	-	26	-	-	-	-	1,061	73	-
4b.1.2.31	Reactor Cavity Purification	-	60	3	4	8	24	-	23	121	121	-	-	106	108	-	-	-	13,973	814	-
4b.1.2.32	Reactor Coolant	-	225	22	35	121	201	-	132	737	737	-	-	1,607	920	-	-	-	147,766	3,319	-

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.2.33	Recirculating Spray	-	340	41	88	736	227	-	269	1,701	1,701	-	-	9,746	1,038	-	-	-	488,849	4,882	-
4b.1.2.34	Residual Heat Removal	-	414	13	50	628	-	-	207	1,312	1,312	-	-	8,313	-	-	-	-	337,582	6,055	-
4b.1.2.35	Safety Injection	-	260	-	-	-	-	-	39	299	-	-	299	-	-	-	-	-	-	4,011	-
4b.1.2.36	Sampling	-	30	1	1	3	4	-	9	48	48	-	-	40	19	-	-	-	3,369	449	-
4b.1.2.37	Sampling (RCA)	-	86	2	2	2	14	-	26	131	131	-	-	23	63	-	-	-	6,598	1,301	-
4b.1.2.38	Service Air -Station Black Out	-	3	0	1	8	-	-	2	14	14	-	-	103	-	-	-	-	4,184	48	-
4b.1.2.39	Vent & Drain	-	74	1	3	33	-	-	24	135	135	-	-	442	-	-	-	-	17,945	1,031	-
4b.1.2.40	Vent & Drain (RCA)	-	27	1	2	4	13	-	11	57	57	-	-	49	58	-	-	-	7,169	367	-
4b.1.2.41	Waste Disposal	-	160	12	17	58	96	-	76	418	418	-	-	762	458	-	-	-	70,158	2,271	-
4b.1.2.42	Waste Disposal (RCA)	-	205	16	18	15	132	-	91	477	477	-	-	200	605	-	-	-	62,389	2,713	-
4b.1.2.43	Waste Neutralization	-	63	1	3	34	-	-	21	122	122	-	-	448	-	-	-	-	18,194	854	-
4b.1.2	Totals	-	12,053	356	799	6,917	1,939	-	4,453	26,518	23,775	-	2,743	91,572	8,978	-	-	-	4,513,573	173,408	-
4b.1.3	Scaffolding in support of decommissioning	-	767	13	5	47	8	-	203	1,042	1,042	-	-	565	35	-	-	-	28,588	12,370	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor Containment	1,415	938	43	138	233	543	-	1,138	4,448	4,448	-	-	3,084	10,190	-	-	-	921,883	32,755	-
4b.1.4.2	Discharge Canal	-	151	72	275	-	406	-	188	1,091	1,091	-	-	-	15,633	-	-	-	1,563,300	1,796	-
4b.1.4.3	Fuel Storage Building	445	490	8	14	145	27	-	376	1,504	1,504	-	-	1,924	647	-	-	-	141,972	13,098	-
4b.1.4.4	Maintainance & Outage Building	31	3	1	0	-	3	-	17	55	55	-	-	-	119	-	-	-	11,909	483	-
4b.1.4.5	Petroleum Tank Excavation	-	12	36	137	-	203	-	78	466	466	-	-	-	7,803	-	-	-	780,300	173	-
4b.1.4.6	Primary Auxiliary Building	226	75	11	10	33	57	-	153	564	564	-	-	434	2,122	-	-	-	229,089	4,203	-
4b.1.4.7	Turbine Building	402	909	431	1,655	-	2,448	-	1,332	7,177	7,177	-	-	-	94,163	-	-	-	9,416,250	16,710	-
4b.1.4.8	Waste Holdup Tank Pit	43	12	2	2	4	11	-	28	102	102	-	-	54	404	-	-	-	42,501	770	-
4b.1.4	Totals	2,561	2,589	602	2,231	415	3,699	-	3,310	15,407	15,407	-	-	5,496	131,080	-	-	-	13,107,200	69,989	-
4b.1	Subtotal Period 4b Activity Costs	3,081	15,468	1,130	3,106	7,379	6,207	-	8,407	44,779	42,036	-	2,743	97,633	142,659	-	-	-	17,879,560	256,768	-
Period 4b Additional Costs																					
4b.2.1	Final Site Survey Program Management	-	-	-	-	-	-	652	196	848	848	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	ISFSI License Termination	-	647	2	103	-	86	663	298	1,800	-	1,800	-	-	3,189	-	-	-	382,518	8,165	1,280
4b.2.3	AOC PCB Soil Remediation	-	285	93	622	-	1,781	-	619	3,399	3,399	-	-	-	99,394	-	-	-	10,436,000	2,331	-
4b.2.4	AOC Soil Remediation	-	72	7	323	-	643	-	228	1,272	1,272	-	-	-	24,481	-	-	-	1,860,556	604	-
4b.2	Subtotal Period 4b Additional Costs	-	1,004	101	1,048	-	2,509	1,315	1,341	7,318	5,518	1,800	-	-	127,064	-	-	-	12,679,070	11,100	7,520
Period 4b Collateral Costs																					
4b.3.1	Process liquid waste	68	-	38	209	-	148	-	106	569	569	-	-	-	533	-	-	-	31,991	104	-
4b.3.2	Small tool allowance	-	390	-	-	-	-	-	59	449	449	-	-	-	-	-	-	-	-	-	-
4b.3.3	Decommissioning Equipment Disposition	-	-	135	59	502	82	-	118	896	896	-	-	6,000	373	-	-	-	303,507	88	-
4b.3.4	Survey and Release of Scrap Metal	-	-	-	-	-	-	894	268	1,162	1,162	-	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	68	390	173	268	502	230	894	551	3,077	3,077	-	-	6,000	907	-	-	-	335,498	192	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	775	-	-	-	-	-	-	194	969	969	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	789	79	868	868	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	1,806	-	-	-	-	-	452	2,258	2,258	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	2,943	-	-	-	-	-	441	3,384	3,384	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	17	12	-	173	-	47	248	248	-	-	-	3,817	-	-	-	76,334	30	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,674	401	3,075	3,075	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	449	45	493	493	-	-	-	-	-	-	-	-	-	-
4b.4.9	Site O&M	-	-	-	-	-	-	2,541	381	2,922	2,922	-	-	-	-	-	-	-	-	-	-
4b.4.10	Radwaste Processing Equipment/Services	-	-	-	-	-	-	485	73	557	557	-	-	-	-	-	-	-	-	-	-
4b.4.11	Groundwater Monitoring	-	-	-	-	-	-	67	10	76	76	-	-	-	-	-	-	-	-	-	-
4b.4.12	Corporate A&G	-	-	-	-	-	-	2,428	364	2,793	2,793	-	-	-	-	-	-	-	-	-	-
4b.4.13	Security Staff Cost	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	29,240

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4b Period-Dependent Costs (continued)																					
4b.4.14	Utility Staff Cost	-	-	-	-	-	-	19,535	2,930	22,465	22,465	-	-	-	-	-	-	-	-	-	337,280
4b.4	Subtotal Period 4b Period-Dependent Costs	775	4,749	17	12	-	173	29,999	5,571	41,297	41,297	-	-	-	3,817	-	-	-	76,334	30	366,520
4b.0	TOTAL PERIOD 4b COST	3,924	21,612	1,421	4,435	7,882	9,119	32,208	15,870	96,470	91,928	1,800	2,743	103,633	274,446	-	-	-	30,970,460	268,090	374,040
PERIOD 4d - Delay before License Termination																					
Period 4d Period-Dependent Costs																					
4d.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4d.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4d.4.3	Health physics supplies	-	60	-	-	-	-	-	15	74	74	-	-	-	-	-	-	-	-	-	-
4d.4.4	Disposal of DAW generated	-	-	0	0	-	3	-	1	4	4	-	-	-	66	-	-	-	1,322	1	-
4d.4.5	Plant energy budget	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
4d.4.6	NRC Fees	-	-	-	-	-	-	143	14	157	157	-	-	-	-	-	-	-	-	-	-
4d.4.7	Site O&M	-	-	-	-	-	-	73	11	84	84	-	-	-	-	-	-	-	-	-	-
4d.4.8	Groundwater Monitoring	-	-	-	-	-	-	34	5	39	39	-	-	-	-	-	-	-	-	-	-
4d.4.9	Corporate A&G	-	-	-	-	-	-	1,235	185	1,420	1,420	-	-	-	-	-	-	-	-	-	-
4d.4.10	Security Staff Cost	-	-	-	-	-	-	8	1	9	9	-	-	-	-	-	-	-	-	-	4,149
4d.4.11	Utility Staff Cost	-	-	-	-	-	-	506	76	582	582	-	-	-	-	-	-	-	-	-	9,680
4d.4	Subtotal Period 4d Period-Dependent Costs	-	60	0	0	-	3	2,179	335	2,578	2,578	-	-	-	66	-	-	-	1,322	1	13,829
4d.0	TOTAL PERIOD 4d COST	-	60	0	0	-	3	2,179	335	2,578	2,578	-	-	-	66	-	-	-	1,322	1	13,829
PERIOD 4e - License Termination																					
Period 4e Direct Decommissioning Activities																					
4e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	152	46	198	198	-	-	-	-	-	-	-	-	-	-
4e.1.2	Terminate license									a											
4e.1	Subtotal Period 4e Activity Costs	-	-	-	-	-	-	152	46	198	198	-	-	-	-	-	-	-	-	-	-
Period 4e Additional Costs																					
4e.2.1	Final Site Survey	-	-	-	-	-	-	7,880	2,364	10,243	10,243	-	-	-	-	-	-	-	-	113,935	3,120
4e.2.2	Staff relocations expenses	-	-	-	-	-	-	3,935	590	4,525	4,525	-	-	-	-	-	-	-	-	-	-
4e.2	Subtotal Period 4e Additional Costs	-	-	-	-	-	-	11,814	2,954	14,768	14,768	-	-	-	-	-	-	-	-	113,935	3,120
Period 4e Period-Dependent Costs																					
4e.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4e.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	817	-	-	-	-	-	204	1,021	1,021	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	2	1	-	15	-	4	21	21	-	-	-	330	-	-	-	6,603	3	-
4e.4.5	Plant energy budget	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	-
4e.4.6	NRC Fees	-	-	-	-	-	-	259	26	285	285	-	-	-	-	-	-	-	-	-	-
4e.4.7	Site O&M	-	-	-	-	-	-	719	108	827	827	-	-	-	-	-	-	-	-	-	-
4e.4.8	Groundwater Monitoring	-	-	-	-	-	-	38	6	44	44	-	-	-	-	-	-	-	-	-	-
4e.4.9	Corporate A&G	-	-	-	-	-	-	1,403	210	1,613	1,613	-	-	-	-	-	-	-	-	-	-
4e.4.10	Security Staff Cost	-	-	-	-	-	-	476	71	548	548	-	-	-	-	-	-	-	-	-	11,786
4e.4.11	Utility Staff Cost	-	-	-	-	-	-	6,319	948	7,267	7,267	-	-	-	-	-	-	-	-	-	95,464
4e.4	Subtotal Period 4e Period-Dependent Costs	-	817	2	1	-	15	9,627	1,639	12,100	12,100	-	-	-	330	-	-	-	6,603	3	107,250
4e.0	TOTAL PERIOD 4e COST	-	817	2	1	-	15	21,594	4,639	27,067	27,067	-	-	-	330	-	-	-	6,603	113,938	110,370
PERIOD 4 TOTALS		4,334	60,988	11,320	13,821	28,209	41,578	93,223	55,286	308,759	301,677	1,800	5,282	381,062	334,761	3,330	501	496	49,111,670	735,546	983,015

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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes: Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor Containment	-	8,833	-	-	-	-	-	1,325	10,158	-	-	10,158	-	-	-	-	-	-	84,987	-
5b.1.1.2	Buried Fuel Oil Tanks	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	50	-
5b.1.1.3	Control Building	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	335	-
5b.1.1.4	Diesel Generator Building	-	139	-	-	-	-	-	21	160	-	-	160	-	-	-	-	-	-	1,688	-
5b.1.1.5	Electrical Penetrations Building	-	160	-	-	-	-	-	24	184	-	-	184	-	-	-	-	-	-	1,487	-
5b.1.1.6	Electrical Tunnel & Retaining Walls	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	507	-
5b.1.1.7	Equipment Hatch Enclosure	-	36	-	-	-	-	-	5	41	-	-	41	-	-	-	-	-	-	325	-
5b.1.1.8	Fan House	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	1,656	-
5b.1.1.9	Fuel Storage Building	-	316	-	-	-	-	-	47	363	-	-	363	-	-	-	-	-	-	3,147	-
5b.1.1.10	Maintainance & Outage Building	-	279	-	-	-	-	-	42	320	-	-	320	-	-	-	-	-	-	3,353	-
5b.1.1.11	Misc Structures	-	5,302	-	-	-	-	-	795	6,097	-	-	6,097	-	-	-	-	-	-	57,848	-
5b.1.1.12	Petroleum Tank Excavation	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	154	-
5b.1.1.13	Primary Auxiliary Building	-	713	-	-	-	-	-	107	820	-	-	820	-	-	-	-	-	-	7,190	-
5b.1.1.14	Screenwell Structure	-	1,228	-	-	-	-	-	184	1,412	-	-	1,412	-	-	-	-	-	-	9,322	-
5b.1.1.15	Steam Generator Storage Facility	-	709	-	-	-	-	-	106	816	-	-	816	-	-	-	-	-	-	7,951	-
5b.1.1.16	Tank Pads & Foundations	-	156	-	-	-	-	-	23	179	-	-	179	-	-	-	-	-	-	1,814	-
5b.1.1.17	Transformer Pad	-	119	-	-	-	-	-	18	137	-	-	137	-	-	-	-	-	-	1,382	-
5b.1.1.18	Turbine Building	-	814	-	-	-	-	-	122	936	-	-	936	-	-	-	-	-	-	9,792	-
5b.1.1.19	Turbine Pedestal	-	1,091	-	-	-	-	-	164	1,254	-	-	1,254	-	-	-	-	-	-	8,915	-
5b.1.1.20	Waste Holdup Tank Pit	-	81	-	-	-	-	-	12	93	-	-	93	-	-	-	-	-	-	806	-
5b.1.1.21	Water Tank and Meter House	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	281	-
5b.1.1	Totals	-	20,278	-	-	-	-	-	3,042	23,320	-	-	23,320	-	-	-	-	-	-	202,992	-
Site Closeout Activities																					
5b.1.2	BackFill Site	-	4,226	-	-	-	-	-	634	4,860	-	-	4,860	-	-	-	-	-	-	10,846	-
5b.1.3	Grade & landscape site	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	27	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	111	17	127	127	-	-	-	-	-	-	-	-	-	1,114
5b.1	Subtotal Period 5b Activity Costs	-	24,511	-	-	-	-	111	3,693	28,315	127	-	28,188	-	-	-	-	-	-	213,864	1,114
Period 5b Additional Costs																					
5b.2.1	Concrete Crushing	-	486	-	-	-	-	3	73	563	-	-	563	-	-	-	-	-	-	2,031	-
5b.2.2	ISFSI Demolition and Restoration	-	1,086	-	-	-	-	22	166	1,274	-	1,274	-	-	-	-	-	-	-	1,590	80
5b.2.3	Unit 1 Legacy Soil Remediation	-	586	68	3,379	-	6,698	-	2,335	13,066	13,066	-	-	-	255,173	-	-	-	19,494,000	5,128	-
5b.2	Subtotal Period 5b Additional Costs	-	2,158	68	3,379	-	6,698	25	2,574	14,903	13,066	1,274	563	-	255,173	-	-	-	19,494,000	8,749	80
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	336	-	-	-	-	-	50	387	-	-	387	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	336	-	-	-	-	-	50	387	-	-	387	-	-	-	-	-	-	-	-
Period 5b Period-Dependant Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	9,291	-	-	-	-	-	1,394	10,684	-	-	10,684	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	1,096	164	1,260	-	-	1,260	-	-	-	-	-	-	-	-
5b.4.5	Site O&M	-	-	-	-	-	-	1,935	290	2,225	2,225	-	-	-	-	-	-	-	-	-	-
5b.4.6	Groundwater Monitoring	-	-	-	-	-	-	204	31	235	235	-	-	-	-	-	-	-	-	-	-
5b.4.7	Corporate A&G	-	-	-	-	-	-	7,464	1,120	8,583	8,583	-	-	-	-	-	-	-	-	-	-
5b.4.8	Security Staff Cost	-	-	-	-	-	-	2,276	341	2,617	-	-	2,617	-	-	-	-	-	-	-	55,427
5b.4.9	Utility Staff Cost	-	-	-	-	-	-	28,802	4,320	33,122	-	-	33,122	-	-	-	-	-	-	-	426,360
5b.4	Subtotal Period 5b Period-Dependent Costs	-	9,291	-	-	-	-	41,777	7,660	58,727	11,044	-	47,684	-	-	-	-	-	-	-	481,787
5b.0	TOTAL PERIOD 5b COST	-	36,296	68	3,379	-	6,698	41,913	13,978	102,332	24,237	1,274	76,821	-	255,173	-	-	-	19,494,000	222,613	482,981

Table A
Indian Point Energy Center, Unit 2
SAFSTOR Decommissioning Cost Estimate
(thousands of 2007 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 5 TOTALS		-	36,296	68	3,379	-	6,698	41,913	13,978	102,332	24,237	1,274	76,821	-	255,173	-	-	-	19,494,000	222,613	482,981
TOTAL COST TO DECOMMISSION		9,737	107,885	11,653	18,286	28,209	50,090	559,122	135,494	920,477	659,351	178,257	82,869	381,062	620,166	3,330	501	496	69,257,500	1,018,835	5,842,571

TOTAL COST TO DECOMMISSION WITH 17.26% CONTINGENCY:	**$920,477**	**thousands of 2007 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 71.63% OR:	**$659,351**	**thousands of 2007 dollars**
SPENT FUEL MANAGEMENT COST IS 19.37% OR:	**$178,256**	**thousands of 2007 dollars**
NON-NUCLEAR DEMOLITION COST IS 9% OR:	**$82,869**	**thousands of 2007 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**623,997**	**cubic feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**496**	**cubic feet**
TOTAL SCRAP METAL REMOVED:	**37,492**	**tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**1,018,835**	**man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense.
a - indicates that this activity performed by decommissioning staff.
0 - indicates that this value is less than 0.5 but is non-zero.
a cell containing " - " indicates a zero value